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[OFFICIAL NOTICE.]

Fortieth Annual Meeting, New England Association of Gas Engineers.

NEW ENGLAND ASSOCIATION OF GAS ENGINEERS,
OFFICE OF THE SECRETARY,
EAST BOSTON, MASS., Jan. 19, 1910.

The 40th annual meeting of the New England Association of Gas Engineers will be held at Young's Hotel, Boston, Wednesday and Thursday, Feb. 16 and 17, 1910. Interesting papers on subjects relating to various topics on gas industries are being prepared, titles of which will be announced later. Members having suggestions, questions or names of applicants for membership should send them to the Secretary at once.

N. W. GIFFORD, Secretary.

[OFFICIAL NOTICE.]

Annual Meeting, Illinois Gas Association.

ILLINOIS GAS ASSOCIATION,
OFFICE OF SECRETARY,
ELGIN, ILLS., Jan. 21, 1910.

To the Members, Illinois Gas Association: The next meeting of the Illinois Gas Association will be held at the La Salle Hotel, Chicago, Ills., March 15 and 16, 1910. A number of excellent papers have been prepared, and an enjoyable meeting is assured.

Yours truly, C. B. STROHN, Secretary.

[OFFICIAL NOTICE.]

Annual Meeting, Southern Gas Association.

SOUTHERN GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
ROME, GA., Jan. 10, 1910.

To the Members, Southern Gas Association: The Annual Meeting of the Southern Gas Association will be held in Chattanooga, Tenn., February 16th, 17th and 18th, next. Headquarters, Hotel Patten. Further information will be given later. Respectfully,

JAMES FERRIER, Secretary.

[OFFICIAL NOTICE.]

Wrinkle Department, American Gas Institute.

WRINKLE DEPARTMENT, AMERICAN GAS INSTITUTE,
OFFICE OF EDITOR, ELECTRIC AND GAS BUILDING,
ATLANTA, GA., Jan. 10, 1910.

To the Members of the American Gas Institute: Please forward contributions for the Wrinkle Department to the above address. I would suggest that each manager address a letter of solicitation to the head of each department of his Company. Kindly assist me in this work I have undertaken, and greatly oblige, Very respectfully yours,

R. C. CONGDON, Editor.

[SPECIAL OFFICIAL NOTICE.]

Bureau of Information, American Gas Institute.

DETROIT CITY GAS COMPANY,
ENGINEERING DEPARTMENT,
DETROIT, MICH., Nov. 26th, 1909.

To the Members, American Gas Institute: Send questions to be submitted to the Bureau of Information for answer to V. F. Dewey, Chairman, Gas Office Building, Detroit, Mich. The Bureau of Information respectfully solicits your troubles. Yours respectfully,

V. F. DEWEY, Chairman.

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JAN 31 1910
SMITHSONIAN DEPOSIT

BRIEFLY TOLD.

THE PROGRESS OF THE INDUSTRY.—It is with great satisfaction that we here refer to the report, abstracted in the current issue, p. 195, covering the sales of gas and by-products in the United States for the calendar year 1908, a year of business depression, the similar to which we have not experienced for over a decade, but which did not really make itself adversely felt, save in the retort oven division of the gas man's trading. The sales of gas for illumination show an increase of 7 per cent. over those of the previous year, which would certainly indicate that the business side of illuminating engineering was being successfully cared for, although in a manner silent and still as compared with the sometimes blatant, always vociferous methods of our competitors. The quantity of coal coked in regular gas works has not shown any considerable variation since 1903, which was lower than the present year. The year 1907 reached the banner mark, with over 4 million short tons. The most important development is in water gas, which shows an increase of over 33 per cent. for 1908, as compared with 1905. By-products have had a ready sale, with the exception of tar, and it is high time that more attention was paid to briquetting and road surfacing. Reports from the various departments of the government have been wholly inadequate for the needs of the industry, and the fact that no report on gas production for 1909 is to be made will add to the sense of wrong from which we have suffered without loud protestation.

JANUARY MEETING, NEW YORK SECTION, ILLUMINATING ENGINEERING SOCIETY.—When Chairman A. H. Elliott opened the January meeting of the New York Section, the evening of the 20th inst., in the United Engineering Society's Building, he addressed one of the largest assemblages the Section has had. The first paper, on "Bowling Alley Lighting," by Mr. T. W. Rolph, was presented in the abstract by the Secretary, Mr. A. J. Marshall, as Mr. Rolph was unable to be present. This was followed by a lecture on "Selling Electric Light," by Mr. T. I. Jones, General Sales' Agent, Edison Electric Illuminating Company, Brooklyn. By means of slides the author brought out various matters which enter into charges for electric current, referring principally to the equipment factor. One slide showed the rate, for a 50-k.w. installation in the cities of Boston, Chicago, Philadelphia and Brooklyn; and, although called by different names, the curves were very close and showed that the readiness-to-serve charge was about the same in all cities. Slides were also shown, giving the various contract forms of the Brooklyn Edison Company—retail, wholesale, maximum demand and flat rate. Mr. Jones stated that the advent of the tungsten lamp had tended to reduce their output, and, in order to overcome this great efforts have been made to obtain special power and long-hour lighting business. So, by means of a subsidiary company, placing tungsten lamps on an installment basis, some 1,700 former gas users were now using electricity, all of which was accomplished in the past 20 months. They had recently completed a contract for an immense sign on the water front, the letters being 12 feet in height, the sign proper being 180 feet in length. The lamps were the 4-candle power A. C. tungsten. The sign rate in Brooklyn is $2.75 per annum for 4-candle power lamps, and $4 per annum for 8-candle power lamps. The signs are alight from dusk to midnight, and are maintained, lighted and extinguished by the Company. A diagram giving the organization of the Selling Department brought out the fact that there was 1 general and 2 local offices, 17 agents and various "specialists." In the discussion which followed, Mr. Israel, Agent of the Philadelphia Electric Company, said they had been most successful in opening local offices, having 8 or 9 at the present time. This he thought was necessary from the fact that the Company covered 130 square miles of territory. Mr. R. S. Hale, General Agent of the Boston Edison Company, stated that while his Company covered 500 square miles of territory, they had obtained excellent results by closing the district offices, giving salesmen desk room and furnishing their consumers a free telephone service. However, he believed that a change back to district offices would be beneficial, for the essence of successful advertising was in a constant but slow change. Mr. Hale is a great believer in regular contracts, for he stated that during the past 5 years no special contracts had been made in Boston. Mr. Littlefield, of the New York Edison Company, stated it was not good business for the central station to make a minimum charge, and that everything should be done to enable the customer to obtain current without annoyance. He was followed by Mr. Moses, in charge of the Illuminating Engineering Department of the Edison Company, who stated that, since September, 1908, applications from some 1,200 consumers for advice had been taken care of. Further, through the work of this department, some 150,000 tungsten lamps had been placed. Referring to the value of show rooms he stated that if they were to have show rooms they must be good ones. In the main office in Boston, during the month of December, the sales amounted to over $10,000. Mr. Macbeth, of the Welsbach Lamp Company, seemed to think that the question of rates as handled by the electric light companies was a matter of getting business and not one of seeking to please the customer, and also pointedly referred to several cases, which looked decidedly like discrimination. Mr. Hanlon, of the Public Service Gas Company, of New Jersey, told of the value of canvassing, citing a small town in Michigan, in which the electric company, through the aid of a solicitor, wired 90 per cent. of all new buildings; but shortly afterwards the gas company hired a solicitor, with the result that it is now piping 90 per cent. of all the new buildings. After further remarks, by Messrs. Gardiner, Graves and Merrill, respecting an easy method of explaining the readiness-to-serve charge to the customer, the subject of the price of tungsten lamps was brought up by Mr. Louis Auerbacher, who stated that a grave mistake had been made in charging a higher price for the large sized tungsten lamp, for if they had all been placed on the market at an equal price to the consumer, he would have purchased the larger size in preference to the smaller, and the benefit to the lighting company would be correspondingly greater. He also called attention to the meagerness with which light is supplied for public lighting, and his statements thereon would seem to be justified if the subsequent discussion (shared in by Messrs. Aplin, Marshall, Blackwell and Owens) might be taken as a criterion.—AD ASTRA.

THE REPORT OF THE CONSOLIDATED GAS COMPANY.—The current annual report of the Consolidated Gas Company, of this city, is a somewhat remarkable document, remarkable in that it shows the total earnings from the Company's gas business to have been $2,749,568, or a sum equivalent to about 3.73 per cent. on the value of the "tangible and intangible" properties employed in "the manufacture and distribution of gas sold by the Company." As these sales mounted into billions of cubic feet, and as the increase in output for the twelvemonth over the preceding one is returned at 6.76 per cent., even at the 80-cent rate it looks that 3.73 per cent., is a pretty small rate of earning on a tremendous volume of trade. However, we know, as everybody else in the country knows, that New York manufacturing concerns have to pay pretty stiff sums for everything entering into their needs—from the costs of raw stuffs down to or up from taxation charges. However, apart from the bookkeeping end of the story, President Cortleyou's narration that the gain in gas output amounted to 1½ billions cubic feet, and that the gain in kilowatts of electric output amounted to 5.7 per cent. (14,406,392 kilowatts), it will be seen there is every reason for congratulation that the Company is not in any sense dwelling near the dread table on which is set the bones for those who came late to the feast. Indeed, a most healthful sign in this regard is the statement that the Company has in use 777,998 separate meters now—this total presumes that in it are counted the meters in use by the branches with which the parent concern maintains intimate relations. And a tribute to this good work of Mr. McLean's division of the business is shown in the placing of 93,919 appliances of all sorts during the year. Con the figures as one will, the admission, yes, assertion, must be made that Mr. Carter and his aides are surely master builders, when it comes to a matter of statistics.

CURRENT MENTION.—

WITH much regret we record the death of Mr. William Lane, at one time well and favorably known to the Western gas fraternity in the last quarter of the last century, from his connection with the Warren (O.) Gas Light Company. He died at the home of his son (Mr. Fred. Lane), at Lancaster, Pa., the morning of the 13th inst. We hope later on to print some account of his useful life.

WE are in receipt of the first catalogue issued by the Humphrey Company, of Kalamazoo, Mich., during 1910. It, of course, has largely, if not altogether, to do with the Company's fine line of automatic water heaters and all the up-to-date paraphernalia which go therewith. Write to Manager H. S. Humphrey for a copy, and we think we will all agree with the writer of the circular letter which accompanies the pamphlet in the statement: "There are new catalogues coming out all the time. We have just issued a new one, which we somehow think is a little finer than the ordinary trade catalogue."

MR. J. B. BURNS has been elected President of the Citizens Gas Company, of Oxford, Pa.

AT the annual meeting of the Keene (N. H.) Gas and Electric Company, no change was made in the executive management.

REPRESENTATIVE UNDERHILL, of Somerville (Mass.) district, Massachusetts Legislature, who is also Chairman of the Committee on Public Lighting, presents to the House the petition introduced in the Massachusetts Senate by Mr. Hultman, of Quincy, that the compensation of the members of the Board of Gas and Electric Light Commissioners be increased, that of the Chairman to $6,000 per annum; of the other Commissioners to $5,000 each.

The Production of Artificial Gas and By-Products in the United States for Years 1907 and 1908.[1]

[Abstracted for the JOURNAL by MR. H. THURSTON OWENS.]

The Department of the Interior has issued an advance chapter from the Mineral Resources of the United States for the year 1908, which has been prepared, as usual, by Prof. Edward W. Parker, of the U. S. Geological Survey, and the prediction that the sales of artificial gas would reach higher records than ever before are well sustained.

During the year 1908 there were nearly 157 billion cubic feet of artificial gas produced, which was sold for some 133 millions dollars, being an increase of 7 millions dollars over 1907, to which should be added over 37 millions dollars received for by-products.

The number of coal and water gas companies reporting, shows a decrease in the former and an increase in the latter, as follows:

Type of Works.	1907.	1908.	Increase.	Decrease.
Coal gas	516	506		10
Water gas	520	552	32	..
Total	1,036	1,058	22	..

The decrease in the number of coal gas companies has been going on since 1904, when there were 534 companies reporting. However, the output from coal gas works showed approximately the same percentage of increase as that from water gas works, namely, 9 per cent. The business depression was plainly shown in the output of the retort oven plants, for these showed a loss of 21 per cent. The total increase for all totalled 7½ millions cubic feet, or 5 per cent., as will be seen from the following figures:

Sales of Gas, Cubic Feet.

	1907.	1908.	Increase.
Coal gas (retort ovens).	20,516,731,000	16,205,925,000	*4,310,806,000
" (gas works)...	34,302,954,000	37,355,888,000	3,052,939,000
Water gas (gas works).	94,634,620,000	103,347,497,000	8,712,877,000
Total.....	149,454,305,000	156,909,310,000	7,455,003,000

* Decrease.

In spite of a loss in output of coal gas of over 1½ millions cubic feet, there was an increase in the amount received for same, owing to an increased price per 1,000 cubic feet. The totals are as follows:

Value of Gas Sold.

	1907.	1908.	Increase.
Coal gas	$36,462,304	$37,227,901	$765,597
Water gas.....	90,173,112	96,343,221	6,170,109
Total	$126,635,416	$133,571,122	$6,935,706

In calculating the average price received per 1,000 sold the government has bulked the retort oven and the gas works coal gas, so that these figures give no indication as to the average price which is received by the companies for high grade gas. The figures for water gas, however, show the ever downward trend of the price of this commodity.

Average Price per 1,000 Cubic Feet Sold.

	1905.	1907.	1908.
Coal gas.....	0.81	0.67	0.70
Water gas	1.00	0.95	0.93

The proportion sold for illuminating and fuel purposes shows that, while there was a loss in the sales of coal gas for fuel purposes, this was offset by the gain in water gas. The striking feature, however, is the gain of over 7 per cent. in the sales for illuminating purposes. Evidently the tungsten lamp did not make much headway among gas users during its first year.

Proportion Sold for Illumination and Fuel.

Year. Kind.	Illumination.	Fuel.	Total.
1907.—Coal ...	30,256,774,000	24,662,911,000	54,819,685,000
1907.—Water .	71,931,612,000	22,703,008,000	94,634,620,000
1908.—Coal ...	32,485,571,000	21,076,242,000	53,561,813,000
1908.—Water..	76,804,546,000	26,542,951,000	103,347,497,000
1907.—Both...	102,088,386,000	47,365,919,000	149,454,305,000
1908.—Both....	109,290,117,000	47,619,193,000	156,909,310,000

The gas unaccounted for still reaches enormous totals, but with a decided decrease in quantity and a larger decrease on a percentage basis, the totals being given as follows:

Unaccounted for.

	1907.	1908.
Coal gas.....	3,422,861,000	3,382,856,000
Water gas.....	7,505,225,000	6,889,706,000
Total.....	11,928,116,000	10,272,562,000

1. See A. G. L. J., Dec. 28, 1908; p. 1109.

Coal Gas Sales.—In point of sales New York leads all other States in coal gas, but it is second to Pennsylvania in the sales for fuel purposes. Sales of 1 billion or over are recorded in 13 States.

Price of Coal Gas.—The average price received in 1908 was 70 cents per 1,000, ranging from 47 in Pennsylvania to 208 in California and Oregon. For illuminating purposes the average was 73 cents, ranging from 35 in Wisconsin to 209 in California and Oregon. The latter also leads in the price received for fuel gas, with 206 cents, while the average in the lowest, Pennsylvania, was only 13 cents.

Water Gas Sales.—Over one-third of the water gas sold in this country is credited to New York, and 14 States sold over 1 billion cubic feet.

Price of Water Gas.—The average price received for water gas was 93 cents, but in only 11 States was the average less than $1; New York being the lowest, with 84 cents. Comparing the price received for fuel purposes, with that for illumination, we find the gas sold for fuel commanded a higher price (namely, 98 cents per 1,000) as against 92 cents for illuminating gas. Taking the individual States, in five the price was the same for both, and in ten States the price for fuel gas was higher.

By-Products.—The by-products show a loss in value of nearly $10,000,000, being almost wholly due to the greatly diminished business of retort oven plants. In the matter of coke, the quantity shows a loss of 23 per cent., and the value 29 per cent. The total sales reported are as follows:

Sales of By-Products.

	1907.	1908.	Decrease.
Coke, in short tons	8,093,144	6,253,125	1,840,019
" value.....	$30,332,644	$21,507,045	$8,825,599
Tar, in gallons	117,991,777	110,430,663	7,561,114
" value	$2,993,568	$2,766,700	$226,868
Anhydrous ammonia, in pounds.	37,560,858	30,615,835	6,945,023
" " value.....	$2,601,057	$2,065,169	$535,888
Ammonium sulphate, in pounds	48,882,237	44,093,437	4,788,800
" " value ...	$1,525,472	$1,322,807	$202,665
Total value.....	$37,452,741	$27,661,721	$9,791,020

Coal Carbonized.—The quantity of coal carbonized in 1908 is greater than that for 1905, but is 2¼ million tons less than 1907. The percentage used in gas works increased from 35 to 38.

Coal Carbonized—Short Tons.

	1907.	Per Cent.	1908.	Per Cent.	Decrease.
Gas works	4,030,074	35	3,553,920	38	476,154
Retort ovens	7,460,587	65	5,699,058	62	1,761,529
Total.....	11,490,661	..	9,252,978	..	2,237,683

Coke.—The yield of coke, in tons sold, shows a decrease of from 70.7 per cent. in 1907 to 63.9 per cent. in 1908, and the price has also decreased from $3.75 to $3.44 per ton. The loss occurring in the retort oven product which only sold for 1 cent more per ton than the gas works coke.

Sales of Coke—Short Tons.

	1907. Quantity.	Price.	1908. Quantity.	Price.	Decrease.
Gas works.....	2,510,106	$3.45	2,051,899	$3.43	458,207
Retort oven....	5,583,038	3.86	4,201,226	3.44	1,381,812
Total.....	8,093,144	$3.75	6,253,125	$3.44	1,840,019

Sales of Gas per Ton of Coal Carbonized.—The figures for yield of gas are, to say the least, startling, as according to the statistics there was 2,000 cubic feet more gas sold for every ton of coal carbonized in gas works in 1908 as compared with the previous year.

Sales per Ton of Coal Carbonized.

	1907.	1908.
Gas works	8,512	10,511
Retort ovens	2,750	2,844

Sales of Tar.—The sales of tar show that the product of gas works was the only one to show an increase, although the quantity produced by water gas works remaining unsold, added to that sold, would also show an increase. Two fields where tar could be sold to advantage remain practically undeveloped—briquetting and road surfacing—and undoubtedly these will receive more attention than has been the case heretofore.

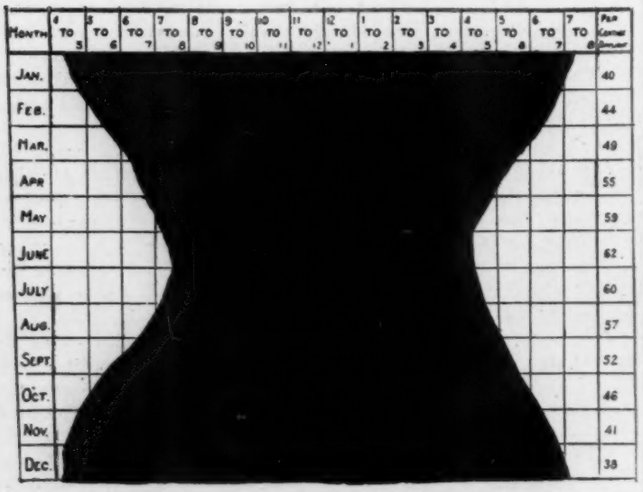
Sales of Tar, Gallons.

	1907.	1908.	Decrease.
Retort ovens.....	53,995,795	42,720,609	11,275,186
Coal gas works....	49,581,965	58,541,220	8,959,255 †
Water gas.	14,414,017	9,167,834*	5,245,183
Total 117,901,777		110,430,663	7,561,114

* In addition 5,559,199 gallons were produced but not sold † Increase

The Yorke Daylight and Darkness Chart.

The accompanying illustration affords a good working example of a "Daylight and Darkness Chart," which was worked out by the Engineer and Superintendent (Mr. E. H. Yorke) of the Portland (Me.) Gas Light Company.



Daylight and Darkness Chart. From 4 O'clock P.M. to 8 O'clock A.M., Black Portions Show Darkness.

The ideas it conveys require no test to make plain their meaning and use, in all of which respects the device has found great favor with the Company's cashier. He has found this graphic of great merit when dealing with a consumer who vows that the hours of daylight and darkness cut virtually no figure when it comes to the making out of a gas bill.

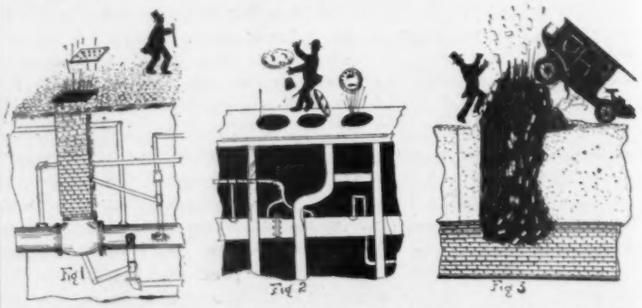
Sewer Gas Explosions and a Heavy Winter.

[By "Engineer."]

While nearly all of the gas explosions, recorded so far as having taken place in cities and towns during the past unusually severe winter season, have been attributed to house gas, in reality the accidents have been caused by sewer gas. Pedestrians walking along the street during the cold term have been surprised to see one or more of the manhole covers suddenly lift upwards as the result of pressure below. Just beneath the innocent looking manhole cover are numberless complications in the way of pipes, brick channels, rafters, braces, shafts, cement conduits and various passages for gases for illuminating purposes, sewer gases, pipes for conveying electrical wiring, etc. In this mass of material the gases of the sewerage often gather, having been generated from the various compositions. These gases are supposed to escape from the underground chambers into space. Perhaps the hydrogen gases are leaking a little from the street mains, and gases may be present from other sources, which find a free outlet through the little holes in the manhole covers when the holes are free. There are workmen in the cities to see to it that the vents in the lids are kept open, for such openings are the safety valves for the accumulated gases of the underworld. Suddenly storms come up, the snow and ice gather on the manhole covers, the street department as well as the employees of the gas company, the street railway line and the police, strive to avoid accidents due to collecting of explosive gases in the manholes and channels beneath the sidewalks and the streets, but occasionally the snow and gathered ice get the best of the workmen. Sealed manhole covers are detected and the necessary tools are obtained to open the safety valve before damage occurs. The cover is pried off and volumes of gases pass out. A workman descends, but is overcome by the gases and has to be hauled up with a rope. All the while the outlet is clearing the spaces below by the escape of the gases and, finally, the workmen can go down and set things to rights and an accident is avoided.

In other cases the gases slowly and quietly gather beneath the persons walking on the sidewalks above or beneath the vehicles on the street pavements above, until the pressure is too much and the manholes are lifted bodily, as illustrated in Fig. 1. Of course, there is excitement. Sometimes the manhole cover or covers go well up into the air and in falling strike people and do injury, whereupon the city is sued. Not long since a lid dropped on a street car in a certain city. In fact, accidents of this kind are not at all uncommon. The matter is referred to in these columns with a view of urging interested parties to take special pains to keep the manholes and manhole covers free and in order while there is an excessively cold and stormy winter underway. The freezing up of all of the vents of a manhole cover is not necessarily the occasion for an explosion, but, according to reports from various centers this winter, quite a number of accidents have resulted directly or indirectly from this cause.

Manhole covers can be examined daily without much extra trouble on the part of the responsible parties. Plenty of salt will clear out the choked vents. I have seen the air escapes completely blocked in numerous instances, and I have also seen snow heaped on some of the lids that were intended to be kept open for ventilating the apartments below the street level. The underground world receives much more notice in some places than in others. I found excellent municipal service in order in some centers, while in others there appeared to be a tendency to wait until some accident occurred before any definite move was made. Consequently, in one of the cities of the class last referred to, a citizen was narrowly missed by flying lids one day when an explosion in accumulated sewer gas took place and forced 3 manhole covers upwards, as in Fig. 2. I have in mind a case in which the explosion took place in one of the big brick sewers, as in Fig. 3. In this case an automobile was upset.



As soon as there are indications of choked underground channels of any kinds of gases, the police usually report the fact, and the street department sends an outfit to investigate. While the members of the party always possess the necessary protected lights, head-hoods and even divers equipments for going below, I have seen the men take chances and descend without any protection for the light carried or for combating the foul gases. Therefore, the unprotected lantern is responsible for some of the explosions which might have been avoided. Workmen get extremely careless in this respect. I have seen men go down the ladder completely disregarding the odors which ought to warn them. Time passes and no sound is heard from the man. An investigation is made and his limp body has to be hauled up and the man revived with fresh air and other treatment. I have seen men go down smoking a pipe. Explosions have resulted from such causes; but the point is, to keep the vents of the sewers and the apartments below the street level free from ice and snow this cold weather. The underworld is a marvel of conduits, pipes, sewers and the like in some busy cities, and it is not remarkable that gases should gather in some of these places. No harm will follow unless the safety valves get closed with snow and ice, as is happening quite often just now.

[Continued from Page 157.]

REPORT OF PROCEEDINGS, FOURTH ANNUAL MEETING, AMERICAN GAS INSTITUTE.

Held in the Hall of Elks, Detroit, Mich., October 20, 21 and 22, 1909.

First Day—Afternoon Session.

Discussion on the paper of Mr. A. E. Forstall.

The President—Has any gentleman any remarks to make on the sliding scale?

Mr. A. M. Barnes—I have read, with a good deal of interest, Mr. Forstall's paper on the sliding scale, and, having had some experience in endeavoring to procure a general sliding scale bill in Massachu-

setts for the past few years, it has occurred to me that certain points in our experience in Massachusetts might be of interest to the Institute, in connection with this paper. Mr. Forstall says, "With these quantities properly fixed, there would be no occasion to repeat the process, as must now often be done." A sliding scale bill that was introduced in Massachusetts on behalf of the Association of Massachusetts Gas Companies, provided, as a tentative measure, a period of 25 years That was very strongly objected to, and objection was made even to a period of 10 years, but it seemed evident, from expressions of opinion given at that time, that it would be practically impossible to pass any sliding scale bill without some limit of time during which there should be an opportunity for a revision of the relation of the price to dividend, in case of improved methods of manufacture, or changes in cost of materials. He also states that, "It would seem that the most equitable method of doing this"—this is, of fixing the rate of interest—"would be to pay no attention at first to the securities actually outstanding at the time, but to value the property of the company as a going concern, and determine the proper rate of return upon this value." And he includes in the value as a going concern an allowance for the value of the established business, which, although it is as real an asset as a stack of benches or a gasholder, is commonly called an intangible asset. It was on this very point that we met the most determined opposition on the part of the opponents of the bill before the Massachusetts Legislature. Several self appointed guardians of the public conscience appeared there to look out for the interests of the public, and they were very bitter in their opposition to any plan which involved a capitalization or a determination of the amount, as Mr. Forstall calls it, of the established business in the total value of the property. In Massachusetts—and I presume in a great many other localities—gas companies have from time to time accumulated more or less of a surplus from the earnings of the company. There was decided opposition to allowing any return whatever to the stockholders upon so much of the property as was represented by the surplus earnings of the company. One gentleman appeared there and called it "A most iniquitous bill." Another man called it "Grand larceny," the idea being that the return upon the property should be no more than upon the amounts actually paid in by the stockholders. Some even objected to allowing a fair rate of interest upon the premiums paid in. Doubtless you know that in Massachusetts, when any new stock is issued by the gas companies, it is issued at the market value, and there were some who held that even any premium which went in was not entitled to the same return as the original capital. There would be, I think, in almost all communities an objection to the idea that any one rate would be taken as fair under all conditions. I think any gas manager in the business would think he was entitled to as much return upon his property employed in the business as any other manager. These are a few points that occurred to me in reading the paper over.

The President—Is there any further discussion of this paper? It is an extremely important subject. It is a matter upon which some of the Public Relations Committee ought to be prepared to speak.

Mr. Forstall—With reference to what was said, as to the impossibility of getting more than a limited term for the sliding scale arrangement, of course, in England, they have been able to get practically unlimited terms, but that does not mean that, because the arrangement when made is made without any fixed term, that body that makes it cannot change it if necessity arises. This would seem the common sense standpoint, if we can get the public educated to see it our way. Perhaps in 10 years they may want it changed, but they can always change it, because their commission would always have the power, as I take it, to make charges. From the standpoint of a gas company there would seem to be no reason for making the arrangement necessarily terminate at the end of 10 years, because possibly at the end of 10 years there would be no necessity for termination. As far as the question about proper allowance to be made for the value of the concern, I think that, and a number of other features my brother speaks of, are simply cases for the proper education of the public, if we can do it. I think his point is that he believes thoroughly in the sliding scale, and, with that belief, the best thing for the gas companies to do is to start by trying to educate the public up to the proper application of the sliding scale.

The President—Mr. McLean has made a study of this subject and we should be very glad if he would explain to us his views.

Mr. McLean—Mr. President, I was asked this morning to contribute something on Mr. Forstall's paper and I have made a few notes. These are mostly to amplify points I observed in Mr. Forstall's paper. Some plan of profit-sharing seems to offer the most practicable solution of the rate question, and I believe the sliding scale plan the most equitable yet tried or proposed. The sliding scale plan, as in operation in England, in justice requires some modifications to suit American conditions. For example, the allowances for hazards should be increased to meet the greater hazards of the business which arise in America from several sources. If we are to continue to enlist private capital in public service enterprises we must have allowance for interest, depreciation and insurance which will impress such capital as sufficient. In prescribing the standard rate of dividend it should be recognized that our business is subject to strenuous competition, involving risks, some of which are taken merely to satisfy the consumer and avoid the appearance of monopolistic arrogance. In this country we may be confronted also with the question whether the profits, if any, in excess of stipulated returns, shall be shared with the patrons or with the public treasury. At Chicago the street railway companies share with the public treasury. At Kansas City, Cleveland and elsewhere, directly with the patrons, in the form of concessions in rates of fare. The labor unions prefer the Kansas City plan and point out that the Chicago settlement means nothing for the non-property owner. Whether the Kansas City plan, or the sliding scale, is the one best calculated to serve the interests of the gas company depends upon several things, among them the form in which its capital is represented, whether largely in stock or largely in bonds. But some profit-sharing plan is the vital thing. The question whether the profit-sharing shall be with the public treasury, or with the consumer, is of minor importance. No company should decline an opportunity to establish a plan of profit-sharing because the representatives of the people demand a division of profits with the public treasury instead of with the consumer. Opinion is commonly based on preference or prejudice, not upon evidence; therefore, the demonstration such as a sliding scale may afford, that the profits of a particular public service corporation are not excessive by comparison with returns in other lines of business, would afford the corporation no complete guarantee against further public attack. Yet the sliding scale narrows opportunity in this direction to the minimum. It is the best means yet devised for allaying public suspicion of extortion and excessive profit and for quieting the demand for charter restrictions, so often made in consequence of this suspicion, or for political purposes, or with a view of forcing municipal ownership by making conditions for private enterprise intolerable. Considered with a view to financial results for the company or the public, the sliding scale may offer no better adjustment than a specific rate, subject to review at the will of the rate-making body; but it is vastly better as a means of avoiding agitation, designed to distract the attention of the voter from other issues, and which, if it does not result in litigation, expensive alike to the company and the public, at least disturbs the investor's sense of security in the permanency and the safety of his investment. Undoubtedly a State public service commission, familiar with the questions that arise in a rate controversy, would facilitate the successful and satisfactory operation of the sliding scale compact; but the institution of such a scale need not await the creation of such a commission in the State now without it. It would suffice to repeal the statutes existing in some States, which provide that the right of the city council to regulate rates at any time shall not be abridged by contract. Subject to approval by the people, that body should have authority to make a contract, giving the sliding scale legal effect during the life of the charter, whether the same be for a definite or indefinite period. If a sliding scale were adopted no State commission would be needed to adjust rates. And if a plan insuring to the consumer or to the public treasury a share of any returns above fixed charges and standard dividend would not avail to protect public service companies against raiders and the ever recurring political agitation of the rate question, it is not a reasonable assumption that a State commission would do so.

The discussion having been declared closed, the President introduced Mr. Irvin Butterworth, who read his paper on the

TECHNICAL AND MECHANICAL PROGRESS IN THE GAS INDUSTRY DURING THE PAST 12 MONTHS.

[For the text of the Butterworth paper, see JOURNAL, Vol. XCI., Dec. 20 and 27, 1909.]

Discussion.

The President—The paper that Mr. Butterworth presented to you means a great deal of painstaking work; I do not know that it calls for any discussion, but if any gentleman would like to ask any ques-

tions, no doubt Mr. Butterworth would be glad to answer them. I not, we will go forward with the programme.

Mr. Egner—I think a paper such as Mr. Butterworth has just read should not go by without some comment. I have been sitting here closely watching to see if he missed anything. I think Mr. Butterworth has forgotten nothing. Therefore, I move a hearty vote of thanks for his excellent work in the preparation of this paper. [Seconded by Mr. Gartley and adopted.]

The President introduced Dr. Edward P. Hyde, Director of the Physical Laboratory, National Electric Lamp Association, who read a paper on

THE RELATION OF NATURAL SCIENCE TO THE DEVELOPMENT OF LIGHTING.

In the onward march of scientific and technical development and advancement it is expedient that we pause at intervals, and, aided by memory and imagination, that we mount some commanding hill of contemplation. In retrospect we scrutinize the pathway of our progress; in prospect we scan the vast field of opportunity. We are encouraged by our accomplishments and are spurred on by our possibilities; but what is more important than either of these, we realize afresh that the present is not all, that indeed it is but a pitched camp on the endless plains of time.

Let us stop for a while to-day in our mad, onward rush, to take our bearings. Would that it lay within my power to present to you a complete, accurate picture of the development of all phases of lighting, properly correlated, and to reveal to you a classified scheme of new opportunities. Unfortunately time and personal incompetency preclude the former and natural limitations the latter. May we not, however, trace the development of lighting, as well as of every other industrial art, to an antecedent development of scientific knowledge, and thereby secure the key to both the accomplishments of the past and the possibilities of the future?

The art of lighting has followed in the wake of the achievements of science; the possibilities of lighting must depend upon the further development of science. I think we are all too prone to forget the debt which technical and industrial development owes to that oft-neglected and much discouraged science which constitutes the foundation for practical applications, and without which the innumerable comforts and conveniences of modern life would be impossible.

The interdependence of scientific conception and industrial application is so patent, even to the most casual observer, that it would be presumptuous to undertake to demonstrate the intimate relationship existing between these two branches of human knowledge and human achievement. Yet I fear even the most thoughtful are apt at times to acquire a somewhat distorted perspective. We have but to turn the pages of history to convince ourselves of the truth of the proposition, "Every industrial achievement is traceable to some antecedent discovery of natural science." And I am inclined to think that the more careful student of the history of natural science and the industrial arts will at the same time be convinced of the truth of the converse of this proposition, viz., "Every discovery of natural science conduces to some subsequent industrial application." The direct proposition gives the keynote to the developments of the past; the converse proposition gives the keynote to the possibilities of the future.

The cycle of the conception and application of scientific truth is of variable duration. In one epoch an hypothesis is conceived or a new phenomenon discovered; in another it receives experimental confirmation and is correlated with the rest of classified knowledge; in another it is applied to meet some human need or to satisfy some human desire, and then we all forget its origin in the close familiarity of everyday life with it. This entire cycle may take place within the brief period of a single human life, or it may extend over centuries. The important fact to be remembered is that every achievement of scientific investigation will complete its cycle at some time.

Illustrations crowd upon us in every domain of applied science. Indeed the very term "applied science" records indelibly the scientific origin of those applications which have made their advent so recently that their parentage has not yet been forgotten. Messages transmitted through the medium of electric waves we call "Marconigrams;" but do we forget that, without the theory of the physicists, Faraday and Maxwell, and the brilliant experiments of the physicist Heinrich Hertz, there would be no wirele s telegraphy to-day? As a still more familiar illustration it is only necessary to consider the navigation of the seas, which wireless telegraphy is now robbing of many of its perils, to be reminded of the scientific origin of the most commonplace achievements of our civilization. The mariner's compass and the science of the heavens are the prerequisite conditions of every trans-oceanic passage, but few of us picture the unappreciated scientist pursuing in his isolation the investigations which have brought happiness and wealth to thousands of his posterity.

In these homely illustrations one man has conceived, another has applied and humanity has reaped the benefit. It sometimes happens that scientific ability and practical genius are united in a single individual. One of these rare examples is to be found in the late, deeply lamented, Lord Kelvin, whose pioneer work on the trans-Atlantic cable stands out uniquely as the accomplishment of the happy combination of pure science and engineering application. In our present highly complex and completely differentiated civilization the combination of scientific imagination and engineering accomplishment in a single individual is rare, and quite likely, I think, to become obsolete. On the other hand, the relation between the physicist and the engineer is daily growing closer. The discoveries of science are more easily grasped at and more quickly applied. The differentiation of functions is accompanied with an integration of results. This is the only proper organization, and to those far-sighted men, who appreciate the interdependence of theory and practice, in whatever branch of human activity they may be engaged, will ultimately come to the fullest measure of genuine success.

Let us consider briefly some of the scientific problems with which we are confronted at present. The first prerequisite to an exact and fruitful science is an exact system of nomenclature and standards. We have just emerged from a successful campaign for a common national and international unit of luminous intensity. We should just be entering upon a longer and perhaps more trying campaign in behalf of a more suitable and universal system of nomenclature, definitions and units. We should, if possible, have a universally accepted primary standard of light worthy of the name; and I am confident that, if an adequate standard is developed, it will sooner or later receive international sanction. The adoption of a common international unit was the first necessary step; but we should not stop here. Let us press onward to a common scientifically accurate standard of light which may serve as the reproducible custodian of our common unit.

We are in dire need of a universal, adequate nomenclature as attested by the confusion and difference of opinion which prevail. Shall we call the unit of luminous intensity the "candle," or shall we break with the past and in adopting the new unit call it the "pyr," or the "phos," or some other of the various names proposed by Blondel and others? At both of the last two conventions of the American Gas Institute I had the great privilege and pleasure of attending your sessions, and of addressing you as an exponent of the common national and international candle. To-day I have no case to present, no particular cause to plead, I have only to report to this Institute what, as a casual observer on the hill of contemplation, I see on the horizon. And one thing that I think I see clearly is the need for a more universal, more adequate system of nomenclature and definitions.

It seems to me we should sit calmly and deliberately and give our best efforts, in conjunction with others of this country and abroad, to the consideration of these questions, and that we should not be contented until we have agreed upon a scheme which is theoretically correct and practically applicable and convenient. The importance and value of the work of your committees on "Methods of Taking Candle Power of Gas," on "Calorimetry," and on "The International Unit of Candle Power," cannot be overestimated. We need more work of this kind, carried out with the same thoroughness and definiteness of result.

As an illustration of some of the advantages to be gained by adopting and practicing a more modern system of nomenclature, I would bring to your attention once again the idea of "light flux." It might be objected by someone that this idea of "light flux" should scarcely be adduced in illustration of very modern innovations, since it was suggested some 15 years ago by Blondel. In reply to such an objection I would ask, how many of you are using "light flux" in your daily practice? Indeed, judging from current publications in the technical press of this country, it would seem that to many not only the application, but the very conception of the idea of "flux of light," is startlingly new and original, owing probably to a lack of appreciation of its practical utility.

With Blondel I would be inclined to base my system on the idea of flux as the foundation, although I should prefer to modify slightly the prevailing definition of the term. As ordinarily defined, flux is intimately associated with a solid angle. Since a solid angle has

significance only in the case of point sources, and in order, moreover, to bring our photometric nomenclature into accord with those of analogous sciences, I found it very convenient, several years ago, in studying the mathematical theory of radiating surfaces,[1] to consider *flux* as a point function in space. Without stopping now to elaborate the idea which is discussed at some length in the article to which reference is given, it is sufficient to say that I defined the *specific luminous flux* (or perhaps better, the *intensity of flux*, or even simply the *flux*) at any point in space, and in any given direction, as the rate of flow of luminous energy across a unit area normal to the given direction at the given point. The total flux from any point or extended source or group of sources is then the integral of this point function taken over a closed surface inclosing the source or sources. Whatever should ultimately be adopted, let us approach the matter with no unalterable bias of false precedent or short-sighted commercialism. It is my observation that whatever is right, based on sound principles, will ultimately prevail, and bring with it commercial success, no matter how difficult the transition from the old to the new may have seemed.

In this connection I want to ask your most careful consideration of the claims of the metric system. In the reconsideration of the nomenclature and units of photometry we shall come face-to-face with the question of the adoption of the metric system. What shall we do with it? I personally believe there is little doubt but that ultimately the metric system will prevail universally. What shall we do with it now? Shall we take the lead and urge the adoption of a unit of illumination which shall be expressed in centimeters and not in feet, or shall we still insist upon the "foot-candle?" Even in England, the birthplace of the British system, there is a strong feeling in favor of the more scientific definition—more scientific because the metric system is the alphabet of natural science in all civilized countries. Whatever may be the outcome, let us not shrink from the important task, arduous as it may be, of undertaking honestly and seriously, in co-operation with other interested bodies, the reconstruction of our system of nomenclature and units.

Although an exact system of nomenclature and standards is a prerequisite to an exact and fruitful science, we should remember that it is only a necessary preliminary. Names and units have value only as affording means of recording and transmitting from one to another the accomplishments of scientific thought and investigation. It is to the science itself, rather than the langage of science, to which I would especially ask your attention to-day. What are the vital scientific problems in connection with lighting which confront us at the present time? These problems may be divided into three classes:

(1.) Those which have to do with the production of light.
(2.) Those which have to do with the utilization of light.
(3.) Those which have to do with the effects of light.

Under the first head would come the study of the laws of radiation and of the radiating properties of matter; under the second the study of the reflecting, absorbing and diffusing properties of matter; under the third the study of the action of light on the eye, on the skin and on microscopic organisms.

Although much progress has been made, particularly in recent years, in our knowledge of the laws of radiation and of the radiating properties of matter, the doors to this field are still wide open. We have but to recall that, even in the electric arc, one of the most efficient light producers in use, l ss than ½ the energy is available for light. Practically all of the rest of the energy is radiated in the form of heat, in wave lengths too long to affect the human eye. What would we think of a motor or any other transformer of energy that had an efficiency under 50 per cent.? And yet the low efficiency of luminous sources persists despite the constant efforts that are being put forth to improve it. The problem is still open for solution, and, as in the past, so in the future, the solution will probably come gradually; but whereas in the past much of the progress has been made, in the words of Carl Zeiss, through the "bog of haphazard experiment," we are to look for progress in the future as a result of careful scientific investigation of the radiating properties of matter.

We realize now that it is much better to utilize all the energy of illuminating gas in complete combustion, and to obtain the light from a mantle of rare earths heated to incandescence, than it is to depend for our light on the glowing particles of carbon in the open flame. This higher efficiency of the mantle is probably due to a considerable extent to the peculiar radiating properties of thoria and ceria. But do we know the complete physics of the incandescent mantle? I take it that we do not, and I firmly believe that the most important step toward the improvement of the efficiency of incandescent mantles is a thorough understanding of their properties as they exist now. Knowledge is power; perfect knowledge of things as they are is a most important guide to things as they may become.

Added to our knowledge of the production of light it is necessary that we know how to utilize, economically and effectively, the light we can produce. First, we must be able to measure accurately and practically the light that is available. This is photometry in its broadest sense, involving the sensibility of the eye to light of different wave-lengths, and those manifold complications which arise when we attempt to compare lights of different spectral composition under the varying conditions met in practice. Secondly, we must study the absorbing properties of glass and other globes and reflectors, the reflecting and diffusing properties of those materials which enter into the decorations of our shops and houses, and with these the general fundamental physical laws which underlie the more familiar phenomena.

The whole object of our enterprise is to produce light, a sensation, therefore a phenomenon, which depends on the presence of an observer. We desire light because we want to see, and it is impossible to see without light. All our efforts are concentrated in rendering possible to mankind the convenience and comfort and pleasure of seeing at times, and in places, where the natural light of day does not penetrate. Do we fully appreciate how vital it is that we exert every precaution possible to protect our eyes against the possible ravages of inadequate or harmful natural and artifical illumination? Ophthalmologists tell us that many of our eye troubles are to be ascribed to defective lighting, and yet how little do we know about the real defects of our lighting systems. Our knowledge is so meager and inexact on this, one of the most vital and important questions of the day, that we should be very careful indeed, in our eagerness to learn, that we do not accept indiscriminately all we see written on the subject. Due to the very limitations of our knowledge it is difficult to refute positive statements from others, no matter how sure we may feel inwardly that the statement has no true scientific foundation. It is very easy to make positive statements; my observation is that it is very difficult to demonstrate conclusively the simplest ones.

I think I am correct in stating that at present it is not known exactly to what extent eye injury may arise from degrees of intensity, or to what extent to spectral composition. Dr. Schanz, an oculist, and Dr. Stockhausen, an engineer in Germany, have concluded that ultra-violet light, in such quantities as it is found in many artificial sources, is positively harmful and should be eliminated. To this end they have introduced "Euphos" glass, which, it is claimed, will absorb most of the harmful rays. The presentation of this work before scientific and technical bodies has called forth a storm of protest. In particular, Dr. Voege, of the Staatslaboratorium, of Hamburg, has published the results of numerous experiments to show that in daylight illumination, under comparable conditions, there is more ultra-violet light than in those artificial sources which were found harmful by Drs. Schanz and Stockhausen.

What conclusion, if any, shall we draw? I recently had the great pleasure of visiting the laboratory of Drs. Schanz and Stockhausen, and of witnessing some of their simpler experiments. Their work is most interesting and suggestive. I also had the pleasure of talking with Dr. Voege and of reading his papers. His physical work seems to have been carefully done. It would seem, therefore, there is need for a repetition of the work by the same and also by other observers, giving great care to the conditions of the experiments. The work is difficult and needs encouragement; it is most important, and needs support; and by whomever undertaken, let us insist that no short-sighted commercialism shall distort our perspective. The matter is all too serious to brook any misrepresentation of facts.

In England a commission has recently been appointed, with Prof. Crookes as physicist and Dr. Parsons as ophthalmologist, to investigate the cause of cataract in the eye of certain glass-workers. Whether the serious eye malady is to be ascribed to the harmful effect of certain light on the eye, is not yet determined; but, whatever the decision of the commission, it is indicative that the nations are arising to protect as far as possible the most delicate sense organ of man from unnecessary injury.

Although this is perhaps the most immediate effect of light to be investigated, there are other effects that will deserve our careful attention. Some few scattered experiments have been conducted to show the effect of light on germs. What a boon to humanity it would be if we should find it possible to arrest or check the spread of

1. Hyde—"Geometrical Theory of Radiating Surfaces, with Discussion of Light Tubes." Bureau of Standards Bulletin, Vol. 3, No. 1, 1907; p. 81.

of contagious disease or to revitalize the blood of anemics by the simple application of day or suitable lamp light! I have no particular hope to hold out in these respects, but I do state that the experimental investigations in this not unpromising field are wanting.

In this brief survey with untrained and hazy vision from the hill of contemplation, I have no doubt failed to see many things which stand out sharply on the horizon of others. Other problems, other needs, other obstacles and opportunities present themselves. Let us ever be mindful, however, that the technical and industrial developments of the future rest on the scientific accomplishments of the past and present. Let us, therefore, contribute our share to the present development of science, since it is not our privilege to repay the science of the past for the industrial applications of which we are reaping the harvest to-day.

In this connection I would like to bring to your attention very briefly the work of the Physical Laboratory of the National Electric Lamp Association, with the organization and direction of which I have been intrusted. It has been called the Physical Laboratory in order to distinguish it from chemical and other research laboratories which have for their purpose the immediate development of some commercial product. In outlining to you to-day the scientific problems with which we who are interested in lighting are confronted, I have described to you in the clearest and simplest way the object and purpose of the new Physical Laboratory of the National Electric Lamp Association. Its object is scientific; its personnel consists of several trained physicists and a trained physiologist, together with the necessary clerical and mechanical assistants; its organization is three-fold, the divisions covering approximately the three classes of problems which I have outlined; finally, its purpose is to add whatever little it may toward the development of the science and the solution of the scientific problems with which we are confronted. I invite you all to visit us in Cleveland, O.; I ask your sympathy and co-operation, and I would welcome any suggestions which may conduce to the better development of the science, and ultimately, therefore, to the good of mankind.

(To be Continued.)

A Handsome Gas Showroom Across the Border.

[Communicated by Mr. W. J. Alston, Manager, the Gas Appliance Company, London, Canada.]

We have in the city of London a condition that calls for our best efforts in varied directions. We have a strong competition from electric light, and because we have always fought hard we have increased our gas output to such a degree that there has cropped up a very keen competition in lighting supplies and the smaller appliances, which competition has its good and bad points.

Gas Appliance Company Show Room, London (Ont.) Gas Company.

There can be no question that our competitors bring to the Gas Company some new consumers, but we find the general tendency is to put before the public a cheaper and, for the greater part, inferior class of goods. Now, as we see it, this eventually will result in dissatisfied gas consumers; for that reason we fight our competitors in gas appliances just as sturdily as we do our opponents, the electric current people.

We make an effort to secure the very best and most complete stock of up-to-date appliances possible to get. Further, we make a point to thoroughly try out everything new before we offer it to the public, which method gives us the satisfaction of seeing an ever increasing number of satisfied customers, with a minimum of complaints.

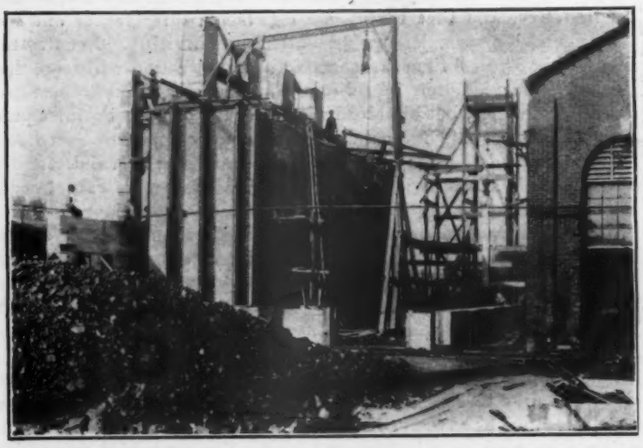
As for advertising, outside of an occasional advertisement pro-

claiming the joys of using gas for all purposes, we do not indulge in newspaper advertising. We inclose, with the Company's gas bills each month, a folder or circular specializing some good appliance, thereby reaching people who use gas a little, but who can be made to use it more by getting them into our store, where we can show the consumer who, using gas for lighting only, that he or she is losing something in life by not cooking by gas, or *vice versa*. We have solicitors, always on the outside, to pick up any new building or store lighting that hangs in the balance; and, above all, we try to get our present consumers fitted up with the very best, so that they turn in more new consumers than come in from all the newspaper advertising we can do.

[Communicated.]

The New Coal Gas Benches at the Works of the Peoples Gas Light Company, Davenport, Ia.

The Parker-Russell Mining and Manufacturing Company, of St. Louis, Mo., recently installed, at the plant of the Peoples Gas Light Company, Davenport, Ia., in a new retort house built to accommodate the same, four benches of horizontal 9's, the contract including the benches and ironwork; also, coke chutes of the McDonald-Mann type. The accompanying illustration affords a fair general view of the stack of benches in a nearly completed state.



The work of constructing the b nches was started by the Parker-Russell Company, August 23, 1909, and completed, ready for foul gas main connection, about October 16th following. The installation consists of a single line of four benches, which are of full-depth, recuperator design and having large, deep furnaces. Hot coke is to be used as fuel in the latter. The retorts are oval-D in shape. The lower tier retorts are 16 inches by 26 inches, the middle and upper tiers being 16 inches by 28 inches, by 9 feet 4½ inches long.

The design of the benches is that from the plan of the Parker-Russell Mining and Manufacturing Company, and all of the fireclay material in the entire stack was supplied by the builders from their own works. The bench iron was made by the Stacey Manufacturing Company, Cincinnati, O., according to designs of the Parker-Russell Company, and erected by the latter Company.

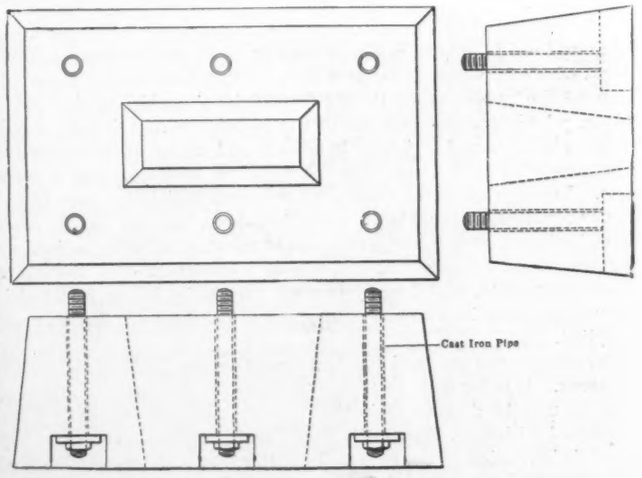
Each bench is provided with its own separate chimney. The first 12 feet length of each chimney consists of masonry work, on top of which rests an 18-inch diameter, steel-extension, 24 feet high, making the total height of each chimney 36 feet from the top of paving of benches.

The tar with ammonia off-take system is of the displacement type, also of the Parker-Russell Company design, and provides for the continual and separate outflow of tar and ammonia liquor as fast as these are formed. It consists of large steel tanks for the collection of tar and ammonia, with an adjustable liquor off-take to regulate the amount of seal. The necessary valves and pipes connect these tanks with the hydraulic main and with the tar and ammonia wells.

The coke chutes, which are of steel, were made by a local company in Davenport after designs of the Parker-Russell Company and are of the McDonald-Mann type. The benches are now under fire and will have been making gas likely prior to this issue of the JOURNAL. The best of results are expected in the operation of this plant, for it is built in a most modern and approved manner.

Removable Foundation Bolts.

It is an odd fact, but one often encountered, that foundation bolts are frequently built permanently in concrete or masonry, despite the faulty practice of so doing. This is particularly true in respect of large and expensive foundations, since if the threads on a bolt become stripped, or injured in any of many ways, it is often an expensive, long-drawn-out job to sufficiently rip out the foundation around the bolt to permit the putting-in of a new one. The plan herewith portrays a way of setting the bolts, so that the latter may be removed whenever necessary without injuring the foundation, or even disturbing it. Quite an advance in respect of this item of construction is described by Mr. Howard M. Nichols, in the issue of *Power*, of comparatively recently date.



Under the Nichols plan a cast iron bolt is built into the foundation at the points where the bolts pass through, which pipe ends in a square pocket close to the foundation bottom. On top of the pocket a cast iron plate is built into the concrete, and the bolts are held in place by large cast iron washers and nuts. When putting a bolt in place, the nut and washer are laid on a plank and pushed into the pocket, so that they come directly under the iron pipe. The washer should be considerably larger in diameter than the bolt so that it can be easily centered. The nut and washer are pressed up hard against the top of the pocket and held there with the plank while the bolt is screwed in from above. A short piece of plank is left permanently in the pocket to keep the bolt from dropping to the bottom of the pocket while placing the bed of the machine on the foundation. This method of building a foundation is applicable only where it is possible to dig the dirt away from the bottom of the foundation and thus obtain sufficient room for the work.

Address of the President (Mr. James W. Dunbar) of the Indiana Gas Association, Delivered on the Occasion of the Second Annual Meeting, Indianapolis, Ind., January, 1910.

The gas industry, of which we are representatives, during the past years has kept apace with the times. Having adverse conditions confronting us, we have overcome difficulties, or, in their presence, have more than held our own, and can with pride point to the achievements which are ours. To-day, the problem that confronts us is our relation with the public, and the tendency, through their representatives, to legislate detrimental to an industry that has done and is doing much to administer to the well-being, comfort, economy and progressiveness of the community we serve.

The Indiana Gas Association is composed of members who represent companies not numerically as many as in other States of the same population. The number of artiffcial gas plants is comparatively small, and were it not that we have conditions peculiar to our situation that demand consideration, we might have found it advantageous to become members of organizations of neighboring States. In no State, however, is there the opportunity and the need, now that natural gas has largely failed, for the organization, development and extension of plants into new territory than at the present time. With the recent adoption of distribution of gas by high pressure installa-

tion, it is among the possibilities to confine to no community the advantages afforded by the supply of gaseous fuel for light, heat and power. It is possible, and most probable, that in almost every agricultural country, in which there is the average product from the soil, and in which there is the average number of prosperous villages, to be able to supply the inhabitants with the conveniences and comforts of gas, made possible by high pressure distribution. To-day there is the opportunity, and the enterprise will not be wanting that will develop an industry requiring the investment of additional capital, the sum total of which would be excelled by no other industry in our Commonwealth, the investment in Gary not excepted, providing investors can feel secure.

During the last few years a few installations of considerable magnitude have been so established; many more are contemplated, but not consummated on account of antagonistic legislative enactments threatened.

I have in mind an organization with a contemplated expenditure of more than $5,000,000 in the supplying of 18 or 20 towns and villages with gas, whose promoters have hesitated because of the condition of the public mind through politicians' ambitions for public favor, who introduce measures in the legislature that, if they should become laws, would seriously handicap and make unremunerative, commensurate with enterprise, an industry that deserves a better fate. In cities of other States, where such legislative enactments have prevailed, the courts, in some instances, but not in all cases, have indicated such a low percentage of returns as being a just expectancy from investments, and which, if maintained by the courts of our own State, will largely prevent companies being justified in extending mains into new territory and into suburbs of districts now supplied.

For our success we are dependent upon the goodwill of the public we serve. It is for us to endeavor to secure that goodwill and even then we may be doomed if justice is not accorded. Recently I was impressed with Gov. Marshall's New Year's response to the Chicago *World's* invitation to the governors of the States of the Middle-West to express their opinions of the greatest need of the Commonwealths over which they presided. Indiana's Governor responded in part as follows:

"Just now, from my standpoint, its greatest need is contentment. By this I mean that it should possess a body of citizens who are content to do a day's work for a day's wage; who are willing to pay a day's wage for a day's work; who are unwilling by enforced employment to increase profits; who really feel that Indiana is the land of opportunity, individuality and manhood, and not the land of knavery, trickery and cunning. Who believes he is not wise who is not just, and that justice is as much the other fellow's right as his own. Maybe a majority of Indiana's citizens are such. I hope so."

Let this spirit of justice be assured our enterprise, and we will aid in Indiana's development, and to the comfort of its citizens; but justice cannot be accorded if legislatures are going to pass bills, arbitrarily reducing the price of gas to a point that will not attract investors.

But few gas companies would object to State legislative control if they were convinced a majority would be just. Accord us the desire to be fair and just, let us demonstrate the justice of our cause and we will be satisfied. The public is always just on propositions in which they are satisfied there is virture, but all men are not yet so far advanced intellectually and ethically as to be wholly disinterested in dealing with public service corporations, and who cannot be swerved from the performance of duty in dealing with them. Our industry is, therefore, menaced and threatened by the caprice of citizens and the ambition of some politician, who will pose as a benefactor of the age if he can secure the enactment of a law reducing the selling price of gas in the city of his constituents.

I was at the session of the Legislature when the bill was passed, reducing, without any investgation as to the merit of rate proposed, the gas rate in Indianapolis. I was impressed by a statement made by a member when called upon to cast his vote. He said: "I do not know if the gas can be sold at a profit at 60 cents, but I vote for the people. Let the Gas Company fight it out in court. I vote 'Aye.'" His remarks were applauded; others voted, prompted by the same motive. This was not justice. And are such motives on the part of some legislators to continue to control? If so, there can be no justice in legislatures so dictated and directed. It seems our salvation is the providing for the appointment of State commissioners to regulate, and then their success in fair dealing will depend upon the appointment of honest, judicial, broad-minded citizens of mental capacity. In the meantime, and at all times, we must give good service, and with good service we must be patient under provocation; always affable and considerate. We know by heart the old, old story of our customers as to how there must be something wrong with the amount of a bill, but we must listen patiently and try to appease, and when specific reasons are given, give that customer special consideration; tell him you will test his meter, examine to see if there are leaks, and if his appliances are properly regulated. Then report back, enumerating your endeavors in his behalf, showing an inclination to do right, that will in many instances convince him of your honesty and sincerity in his behalf. We all have many customers who do not use enough gas in a year's time to pay for service rendered, but an additional increase in cost to us of service we render to customers is each year becoming more and more imperative.

Gas companies have pursued a policy of enterprise commendable, for which the public does not give them credit, in voluntarily reducigg from time to time the price of gas, notwithstanding advance in the cost of labor and material used in manufacture. Profits realized have been smaller per 1,000 feet of gas sold, increased sales being relied upon to make up for losses. In the year 1890 there were 37 gas plants in Indiana selling gas at an average price of $1.81 per 1,000. There are to-day in Indiana but 43 illuminating gas plants. Their average selling price is $1.11 per 1,000. The small increase in the number of plants in 20 years would seem to indicate no attractiveness for investors, and that threatened legislative interference and confiscation no longer make new gas enterprises inviting. Remove this fear and in 3 years' time the manufacturing operation will more than double. The reduction in selling price has not been the result of State interference, but in accord with the rules of good business practice. To-day, candle for candle, gas has no competitor as to cost. Electricity has its place; so have coal oil and tallow candles. The advantage of electricity is convenience, and those who can afford it are often willing to pay the price. With modern appliances gas can be made as attractive and as artistic. The tungsten lamp is a great advance over the carbon filament lamp, but in economy cannot compete with the incandescent gas burner. A 100-watt lamp, with current at 10 cents per k.w.h., costs 1 cent for 80-candle power of light. Ten cubic feet of gas, at $1 per 1,000, consumed in an incandescent gas burner, costs 1 cent for 250-candle power.

This comparison is for rates obtained by the average consumer, and if, by reason of increased use of electricity, a rate of 7 cents per k.w.h. is obtained, we have the ratio of 114 to 250—gas *vs.* electricity. The estimate in each case is for new lamps. The rates of deterioration and life are about equal.

As before stated, electricity as a rule appeals to large users of light, but factory lighting by gas is increasing. There is that about the subtle fluid that appeals to the spirit and charm of minds progressive. The wonder attending its manifestation, the mystery of the force existing, which is harnessed, directed and controlled; the revolution it has effected in transportation and in the installation of motors for power in which the space required is reduced to a minimum. These appeal, and we do not, it seems, realize gas for power is the cheapest. We have not advertised enthusiastically the inducements offered by its use for power. Coal oil is a great competitor, yet there is no reason why its use cannot be largely supplanted by gas. The cheapness of coal oil is its small unit of light; candle for candle, gas is the cheapest. Some 5 years ago a sale of gas in a community of 3,000 cubic feet per capita was large. Now in some favored situations this has been more than doubled. We, most of us, cannot hope to approach the attainment of corporations favorably situated, yet it must impress upon all of us our possibilities.

I wish something could be done to enable us to be able to purchase combination fixtures that would give gas a fair show. Fixtures on the market of this kind are so planned to give electricity all the advantage. I have in mind a church recently built that demanded both gas and electric service, gas to be used when electric service failed. The fixtures had the gas keys on the side, so that no appliance could be used to turn on the flow of gas. One night the electricity failed; the fixtures were 20 feet above the floor. No stepladder was to be had, and one would have done no good as the floor was slanting and the seats would have interfered with a foothold. So the congregation were compelled to forego the religious peace and consolation hoped for by attendance upon worship.

Combination fixtures are a liability to a gas company. I would prefer recommending in many instances straight electric fixtures and

endeavor to avoid the installation of dual service where gas, the reliable, is only used when electricity fails.

Perhaps in no other business enterprise are to be found so many unprofitable customers as in our own. Any system of rates that does not provide for a minimum yearly consumption is unjust. To render a bill for 10, 20 or 30 cents per month for gas furnished is ridiculously unfair. Maintenance and service charges, aside from gas furnished, are about $5 for each customer per year. The Legislature some years ago passed a law prohibiting the rendering of a minimum bill. This law should be repealed.

The market for residuals is advancing. When it is remembered that coal tar is worth 2 cents per gallon for fuel, we should not permit it to be sold for a price as low as prevailed a year ago. Coke per ton at 65 per cent. the price of anthracite more than pays the consumer for any additional labor and saves him more than 30 per cent. in his fuel bill. I feel that, in some instances, we attempt to charge too high a local price without first creating the demand by selling at a price more profitable to both the consumer and the company. Many of the small plants do not save their ammonia, and while in some instances it would not more than pay a small interest on investment, yet it would afford a better condensing system to an extent in many places much needed.

Most of the companies we represent cannot afford constantly the service of a chemist, so I call your attention to the opportunity, which is ours, to employ Mr. Davis, Chemist of the Indianapolis Gas Company, for any special work. The advantage to a gas company of his services is in one instance set forth by Mr. Danforth in his paper. He tells how easily and inexpensively Mr. Davis told him how to find a leak in his mains. Many conditions arise that never again confront, so that one "moves in the dark" unless expert talent is brought to our assistance. I have employed Mr. Davis to my profit and peace of mind and take great pleasure in commending him as a man who can tell you the cause of your troubles and how to avoid them in the future.

At this, the 2d annual assembly of the Indiana Gas Association, I wish to impress the advantage to us of its becoming a successful organization. Necessarily small in number, and many of its members representing small companies, we have been at a disadvantage in not being personally acquainted. Many of its members have not been permitted to attend larger association meetings. I feel we can all be benefited by membership in and by attendance at these annual meetings. While our first meeting had a creditable presentation of papers, yet the interest in its session was not what it should have been. There are so many phases to any subject that may be presented to an association that cannot be covered by the author that we should regard it as an opportunity for us, either by contribution to the discussion or by questions asked, to make the occasion one of much profit and assistance. May I ask you to be prompt in your attendance and to remain throughout the session? I hope you will do so, and if you will but do so this year, not hesitating to contribute your mite to the discussions, we will all look forward with eager anticipation to next year's meeting. The very smallness of our membership should bind us closer, for but 30 gas companies are represented on the roll, and if we are in earnest to make the most out of the membership, we can be more benefited personally, and our companies will to a greater extent reap the benefit of expenses incurred by our attendance than if we were a larger association. I hope you will honor every member who has written a paper by taking a most lively interest in the discussion.

I have apprsciated the honor of serving you as President for 2 years, and now, about to become a member in the ranks, hope to help you all make this a good Gas Association. It is the men in the ranks who do the fighting that win the battle. Let us then begin our Association's New Year with a resolve to make the Indiana Gas Association to our companies and to ourselves more beneficial than a membership in any other gas association.

Bureau of Information, The American Gas Institute.

Under the direction of the Institute it has been decreed: 1. That the privilege of submitting questions be limited to members of the Institute. 2. Neither the Board of Directors of this Institute, nor the Institute as a body, make themselves in any way responsible for the statements of fact or expressions of view given out by the Bureau of Information.

BUREAU OF INFORMATION, THE AMERICAN GAS INSTITUTE,
HEADQUARTERS, GAS OFFICE BUILDING,
V. F. DEWEY, Chairman. DETROIT, MICH., Jan. 27, 1910.

QUESTION NO. 57, AND ANSWER TO SAME.

Question No. 57.—"In the process of condensation, what is the proper temperature to extract tar from coal gas, having in view—

"(A.) Retaining in the gas the maximum amount of illuminants.

"(B.) The absorption of naphthaline, with the end in view of reducing to a minimum its deposition in the mains after it leaves the station meter?"

Answer.—Section (A.)—By Mr. O. A. Sinsel, Supt., Station B., Detroit City Gas Company:

First—Assuming that section (A.) of Question No. 57 presupposes the removal of a major portion of the tar in the gas after it leaves the hydraulic main, by the use of an impact tar extractor, such as the Pelouze and Audouin type, the answer would resolve itself into the proper temperature to pass the gas through this instrument, getting a high removal efficiency, yet retaining the maximum amount of illuminants in the gas. A temperature at the inlet of the P. & A., ranging between 100° and 115° F., is a safe margin within which to operate. The following tests were made, starting at a temperature of 135° at the inlet of the P. & A. After temperatures and other operating conditions were more or less constant, hourly candle power tests were taken for a period of 24 hours, with a reduction of temperature at the inlet of the P. & A. of 5° at a time. No marked change in the candle power for any one run was recorded, until the temperature was reduced from 95° to 90°, when a drop of 1 candle power was noted. This drop in candle power was verified several times by raising and lowering the temperature between 100° and 90°. At a temperature above 115 the vapor tension of the gas was too high, to make the P. & A. effective on a reasonable differential.

Second.—Assuming, in the process of condensation, that the removal of the tar from the gas is accomplished by no particular extractor or vessel, but by a series of condensers, washers, scrubbers, etc., then the answer would involve a condensing system so well designed and ample as to bring about a gradual cooling of the gas. A slow and uniform condensation, free from any sudden drop in temperature, will maintain an equilibrium that will minimize the deposition of illuminants. The danger in operating without a special tar extractor is in having a limited and faulty condensing system. In this case it would be impossible to remove the tar in a way that would retain the maximum illuminants and keep the condensing vessels free from naphthaline. The gradual removing of the tar presupposes a set of condensing vessels, ample in capacity and well designed. It has been clearly proven by a number of companies that the gradual removal of the tar in the condensers, washers, etc., not only retains the maximum amount of illuminants in the gas, but the tar at the different temperatures of removal either forms a solvent for the naphthaline or mechanically washes the naphthaline, which forms on the surfaces of the vessels, down into the drips.

Following is a brief synopsis of the operating conditions of a plant extracting the tar with the P. & A. by-passed. The gas leaving the foul main is kept down to a temperature between 125° to 135° F., by means of a water-cooled circulating system of liquor through the hydraulic main. This wash causes a precipitation of a great amount of the heavy and lighter tars which otherwise would be carried over to the condensers, etc. The fluidity of this tar in the main automatically keeps it clear and free from pitch formation. The gas is pulled by the exhauster through a primary water tube condenser, the temperature never being reduced more than 10° or 15° in this vessel. It is then pumped through the various condensers, and the work done in each is so adjusted as to reduce the temperature equally in each one. The temperature of the gas entering the tar washer should never be above 75° or below 65°. The outlet of the rotary scrubber will show an increase from 5° to 7° over the inlet temperature.

Answer.—Section (B.)—By Professor A. H. White, University of Michigan:

The illuminants in gas may be divided into the two classes of fixed gases and vapors. The fixed gases, with ethylene as the most important member, will not be materially removed from the gas by any ordinary condensing process. The otner class, vapors, with benzol as the most important member, are always partially removed by the tar, and the question to be considered is really that of equilibrium between the solvent power of the tar for these vapors and their vapor tension which tends to keep them in the gaseous state.

The removal of naphthaline, through the agency of the tar in the condensing process, is brought about in the same way as the removal of benzol, for benzol and naphthaline are closely related hydrocarbons. The fact that benzol is a liquid, and in high favor, and that naphthaline is a solid, and a nuisance, does not constitute an essential difference.

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The theory of the condensing process may be stated as follows: As the gases issuing from the retort cool, the constituents with high boiling point are the first to separate in extremely minute globules, forming "fog." These globules, by impact against each other, coalesce to form large globules, which settle out through their own weight, or are held fast by the tarry surfaces of solid substances with which they come in contact. At lower temperatures, substances of lower boiling point commence to condense. If this were the whole story it would evidently be the proper course to cool the gas to just the boiling point of benzol, 177° F., remove the condensed tar and water mechanically and then proceed with further condensation. However, the case is not so simple, for the tar will have dissolved some of the benzol vapors even above their boiling point, so that it is not possible, by any simple scheme of condensation, to prevent part of the benzol from passing off with the tar. The amount thus dissolved will vary mainly with the temperature at which the tar is separated. The same principle holds true for naphthaline. The practical conflict comes from the fact that it is desired in one-and-the-same condensing operation to remove from the gas more than 99 per cent. of the naphthaline and to leave in the gas practically all the benzol. The two things are incompatible and the result is a compromise. It is, therefore, not possible to state the best temperature for the separation of the tar. It will vary with the temperature of the retorts, the coal used, and the arrangement of the condensing system. It is generally believed that, if the tar is not separated before the gas cools to 100° F., there will be loss of candle power.

It is frequently held, on the other hand, that if the tar is removed at as high a temperature as 120° F. there will be naphthaline troubles. There is at least a probability that naphthaline troubles under these circumstances are due in part to incomplete mechanical removal of the tar, which becomes more difficult at higher temperatures. If tar carrying much naphthaline reaches the scrubbers there may sometimes be liberation of naphthaline, due to the action of ammonia on the phenols of the tar. Some works are, however, able to remove the tar at higher temperatures with presumably better candle power results.

While it is, therefore, not possible to give a definite answer to this question, it is apparent from what precedes that, in the operation of a simple condensing system without naphthaline scrubbers, or subsequent benzol enrichment, the best results as to candle power will be obtained by removing the tar at a high temperature. This may sometimes cause naphthaline trouble, but probably not necessarily so. Data as to the effect of complete removal of tar at higher temperatures are lacking and it is extremely desirable that careful tests should be made on this point.

References: "The Removal of Naphthaline from Coal Gas," by Prof. A. H. White and J. M. Barnes. AMERICAN GAS LIGHT JOURNAL, October 1, 1906, p. 579. "Progressive Age," November 15, 1906, p. 690.

"The Removal of Naphthaline from Coal Gas," by Prof. A. H. White and D. H. Clary; AMERICAN GAS LIGHT JOURNAL: October 23, 1905, p. 663; October 30, 1905, p. 702.

The Committee recommends the above references as additional data on the subject.

The following questions have been submitted to the Bureau:

Question No. 61.—"What is the best accepted method of checking Orsat gas analysis results?"

Question No. 62.—(a) "What is the easiest method of checking the carbonic oxide elements of a gas against a total which is about 34½ per cent. ($X \times CO + Y \times CO_2 = 34.5$ per cent.)?

(b) "What values should be given X and Y?"

Meeting Times of the Various Gas Associations.

American Gas Institute.—Annual meeting, October, 1910. Atlantic City, N. J. Officers: President, Wm. H. Bradley, N. Y., City; Secretary, A. B. Beadle, 29 West 39th street, N. Y. City.

Canadian Gas Association.—Annual meeting, June, 1909. Hamilton, Ont. Officers: President, J. S. Norris, Montreal, P. Q.; Secretary and Treasurer, A. W. Moore Woodstock, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1910. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street. New York City.

Guild of Gas Managers of New England.—Annual meeting, December. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, A. K. Quinn; Newport, R. I.; Secretary, Walter G. Africa, Manchester, N. H.

Illinois Gas Association.—Annual meeting, time, March 18, 1910, Chicago, Ills. Officers: President, E. G. Schmidt, Springfield, Ills.; Secretary-Treasurer, C. B. Strohn, Elgin, Ills.

Illuminating Engineering Society.—Annual meeting, January 14, 1910. Meetings of Sections, monthly. President, W. H. Gartley, Philadelphia, Pa.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City. Sections: New York: Secretary, Albert J. Marshall, 227 Fulton street. New England, Secretary, L. D. Gibbs 39 Boylston street, Boston, Mass. Philadelphia, Secretary, F. N. Morton, Broad and Arch streets. Chicago, Secretary, T. R. Beebe, 157 Michigan avenue,

Indiana Gas Association.—Annual meeting, January 19, 1911, Fort Wayne, Ind. Officers: President, Carl H. Graf, Indianapolis; Vice-President, S. E. Mulholland; Secretary-Treasurer, Philmer Eves, Indianapolis Gas Company, Indianapolis, Ind.

Iowa District Gas Association.—Annual meeting, time, June 23, 24, 25, 1910, Sioux City, Ia. Officers: President, Geo. H. Waring, Omaha, Neb.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association.—Annual meeting, time, September, 1910; ———— Officers: President, B. O. Tippy, Grand Rapids, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April 14, 15 and 16, 1910; Jefferson City, Mo. Officers: President, W. A. Bixby; Secretary and Treasurer, C. L. Clary, Sikeston, Mo.

National Commercial Gas Association.—Annual meeting, third week in October, 1910; Boston. Officers: President, E. N. Wrightington, Boston; Secretary, Lucius S. Bigelow, 106 Fulton street, New York City.

Natural Gas Association.—Annual meeting, May 17, 18 and 19, 1910; Oklahoma City, Okla. Officers: President, William H. McKenzie, Kansas City, Kas.; Secretary, T. C. Jones, Delaware, O.

New England Gas Association.—Annual meeting, third Wednesday in February; Boston. Officers: President, Walter G. Africa, Manchester, N. H.: Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

Oklahoma Electric Light, Railway and Gas Association.—Annual meeting, May 18, 19 and 20, 1910; Oklahoma City. Officers: President, F. H. Tidman, Oklahoma City, Okla.; Secretary-Treasurer, Galen Crow, Guthrie, Okla.

Pacific Coast Gas Association.—Annual meeting, ————, 1910, Los Angeles, Cal. Officers: President, W. B. Cline, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 925 Franklin street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April 13, 1910, Easton, Pa. Officers: President, E. G. Holzer, Easton, Pa.: Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1910; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 1123 Broadway, New York.

Southern Gas Association.—Annual meeting, Feb. 16, 1910, Chattanooga, Tenn. Officers: President, R. C. Congdon, Atlanta, Ga.; Secretary-Treasurer, James Ferrier, Rome, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. ————, 1910, Beaumont, Tex. Officers: President, R. B. Stichter, Dallas, Tex.; Secretary's office, 300 Commerce street, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 11 and 12, 1910, Milwaukee, Wis. Officers: President, R. B. Brown, Milwaukee, Wis.; Secretary-Treasurer, H. H. Hyde, Racine, Wis.

Recent Patent Issues.

Prepared for the AMERICAN GAS LIGHT JOURNAL by ROYAL E. BURNHAM, solicitor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

945,740. Apparatus for Gas Analysis. K. W. Bartlett and J. J. Staley, Madison, Wis., assignors to Northern Water Softener Company, same place.

945,860. Gas Hanger. M. Nuberg, J. Mollien and F. Boss, Grand Rapids, Mich.

945,936. Gas Scrubber Apparatus. A. W. Gow, Edgewood Park, Pa., assignor, by mesne assignments, to the Westinghouse Machine Company.

946,030. Gas Producer. J. R. George, Worcester, Mass., assignor to Morgan Construction Company, same place.

946,146. Gas Purifier. S. G. Merrick, Philadelphia, Pa.

946,226. Gas Fixture. A. Jarmolowsky, New York City.

946,266. Combination Gas and Coal Furnace. F. J. Parker, Cleveland, O.

946,269. Acetylene Gas Generator. W. A. Ready, Nashville, Tenn.

946,345. Mixer for Gas Burners. B. A. Geurink, East Cleveland, O., assignor to the Trenkamp Stove and Manufacturing Company, Cleveland, O.

946,371. Gas Apparatus. J. F. Kistler, San Francisco, Cal.

946,515. Automatic Cut Off for Gas Mains. C. E. Lahmers, New Philadelphia, O.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, Jan. 10th, 1910.

The Hamburg Disaster.—Dangers of Electric Lamps.

It is rather sad to have to commence the New Year with some reference to what is in many respects the most serious catastrophe that has ever been known to occur at a gas works. It involved the loss of 18 lives, 3 of them being women, more or less serious injury to a much larger number, and a very important damage to property. The gas supply of Hamburg is under the control of the municipal authorities, and the plant includes three or four different stations, so that although operations were stopped at the works now

concerned, the whole supply to the district did not suffer. The casuality list, and financial loss, far exceed anything that has been known before, and on account of the unusual employment of women on gas works. I do not remember that the sufferers in previous accidents have included more than one sex. The difficulties of dealing satisfactorily with a matter of this kind are increased by a certain reticence on the part of the authorities in issuing detailed particulars. There is a character in a well known work of fiction, who had such a keen insight into things that he found facts to be somewhat superfluous. If such an individual actually existed in real life, he ought to be able to take up a good position as a writer for the daily press. As usual, the official silence did not hinder the publication of reports, claiming to be more or less authentic, in the daily newspapers. And many of the erroneous conclusions that were drawn are likely to have the unfortunate effect of exaggerating the dangers connected with large gasholders, and of prejudicing the use of gas in general. The press will publish, and will construct an account, if necessary, from the most meager materials, but it is only bare justice to say that they are always willing to accept and to use anything in the way of official or reliable information. And, therefore, it is always wiser, in the case of any happening of sufficient interest to form a good headline, to see that an accurate account of the same is promptly supplied to all neighboring editorial offices.

The holder in question was not, as has been stated, the largest in the world, though it would rank about the sixth place in this respect. It was the largest in Germany, which is another thing, and it was the largest that has been attempted in what is known as the Intze pattern. The special feature of this is the utilization of the interior of the tank for stores or other purposes, and in this particular case the other purposes included a canteen and cooking kitchen, in connection with which the women above referred to where engaged, a double railway track, and stores for firebrick, etc. The advantages claimed are economy in first cost, utilization of ground area that would otherwise be wasted, and a saving in weight. All these are somewhat uncertain in character, and if one or more of them can be proved to possess any value, the same must be discounted by the great increase of risk. It is quite evident that the catastrophe was primarily due to the design, and that with the ordinary construction it could not have happened. But unfortunately it is difficult to make this clear to the public, and they have accepted the Hamburg disaster as a casuality to which any and every gasholder is liable. And I would also guard against any impression that the failure was due to any defect in working out the design or in construction. Both engineers and contractors were the best of their kind, and their names are a guarantee that there was no fault due to ignorance or negligence, that acted as a contributing cause.

The site was on bad, uncertain ground, and the foundation had to be carried on piles. On these a ring of concrete, 22½ feet wide and 3½ feet thick was laid out, together with a strong center, and five radial connections. They formed the base for strong combinations of columns, arranged radially at intervals corresponding to the standards for the guide framing, and supporting an annular platform 15 feet wide, that formed the base of the annular tank. The panels so formed were occupied by doors, windows and solid masonry, forming a pediment to the structure. The annular tank was only about 8 feet wide, but there was a roof over the whole of the interior, a short distance below the water overflow line of the tank, the intention being that the whole surface should be covered by a minimum of 6 inches of water. The holder comprised four lifts, each using 40 feet, the largest was about 240-foot diameter. The content, when filled, would be 7 million feet. There were 32 standards, with horizontal girders at each lift, and diagonal ties, and a special feature was the radial depth of the standards. On the continent they appear to go in for some curious combinations. A little while ago I had occasion to refer to a laboratory situated on a floor above the purifying boxes, and a railway tunnel under a gasholder tank appears equally incongruous. Unless special precautions were taken by careful isolation of the railway foundation from the body of the structure, the vibrations caused by rolling traffic would not tend to assist the tightness of the bolts and rivets.

The structure was completed and the holder tested by full inflation with air at the end of October. It was officially inspected and taken over from the contractors early in November as being perfectly sound and satisfactory. Gas was then turned into it with the usual precautions, and the supply from it to the district was commenced on November 25th. On December 7th, after 12 days' use, and a month after the inspection, the holder suddenly collapsed under circumstances that are largely a matter of conjecture. Gas was being passed into the holder at the moment, and it was just half full, two lifts being out of water and the third just rising, when the holder was observed to rise suddenly to an appreciable extent, and to drop. Flames burst out all round from the openings at the base, and it was evident that the roof of the tank in some internal part had failed. The holder sank rapidly and the crown buckled inwards to a concave shape. The interior of the tank was simply a mass of ruins. The flames also fired the wooden roof of an adjoining gasholder house, in which was a holder containing 1½ million cubic feet of gas. It was necessary to wait until the heat or the falling *debris* determined the fracture of this holder, and in the course of about an hour the contents burst forth and were consumed in the space of a few minutes. It has been remarked that the observed phenomena cannot be accounted for by the failure of the internal tank structure alone. As there was a free vent for the flames from the numerous openings at the base, any explosion of escaping gas in the vault would not lift the holder. It has been suggested that a sufficient quantity of air may have remained in the lower part of the holder to form a "pocket" of mildly explosive mixture, and the firing of this inside the holder, as a consequence of the fracture, may have caused the sudden lift and fall which appears to have preceded the conflagration by a sufficient interval to enable some of the men engaged in painting the framing at the time to make their escape.

We do not, of course, know anything about the measures taken to expel the air from the crown of the holder in this case. But it is a common practice to allow the air to escape from a plug hole or short length of pipe at the center of the crown. Many years ago I was impressed by the fact that on account of the difference in the specific gravity of gas and air, the proper place to take off the air was at the level of the water, and not at the highest point of the crown. Even after the escape of a considerable quantity of gas, at the high point, there is no certainty as to a complete clearance. I found by actual test, that if the vent pipe was placed on the outlet pipe, and not on the holder itself, the air could be displaced, with a very moderate loss of gas. Although the inlet and outlet are perhaps only a yard apart, the unlit gas, being lighter than air, rises straight to the highest point, and it is some time before even the smell of gas can be perceived at the vent. If the vent is allowed to remain open for a short time after the smell of gas is sufficiently pronounced, the holder can be filled and the contents will be found sufficiently free from air to be fit for distribution.

And now we must turn to another catastrophe that resembled the foregoing in respect to appalling suddenness. A large block of shops at Clapham Junction, near London, were completely ablaze in a few minutes, with the result that two or three of the work people had not the chance of making good their escape. Considering that the whole establishment was crowded with Christmas shoppers at the time, it is evident that in the absence of well designed means of rapid exit, the casualty list must have been simply appalling. That it was not so, was a matter of very much more than mere chance or good fortune. The origin of the fire has been traced to the very general practice of lighting up shop windows at holiday times by a number of temporarily placed electric lamps. It is popularly supposed that they are "safe," and that in the event of bursting by excessive voltage or by accidental violence, no harm would be done, and that nothing could be set on fire. This point has been very much labored by electricians who have not hesitated, and even now do not hesitate to claim a special advantage on this score, as compared with other forms of lighting. It is admitted that the conflagration was started by the accidental breakage of an electric lamp of the metallic filament pattern, and as the result of expert evidence at the inquest, it is conclusively proved that lamps of this description, if broken, will ignite celluloid, cotton wool, or any other inflammable material on which the incandescent fragments may happen to fall. In practice, there is little difference between the filament and a gas flame, because when once the contents of the window are well ablaze, whether the originating cause continues or not, is of little importance. There is another consideration. One knows what the risk is, if the gas is not shut off at the main, which is naturally the first precaution in case of fire. The pipes may be burst by the heat or disturbed by falling or disruption of the building, but when this stage is reached neither gas nor anything else can do much further damage. But it is not so clear what happens in other parts of the circuit when the voltage of an electricity conduit is disturbed by the sudden fracture of a lamp or by other causes. Even in the case of a block of buildings packed with inflammable goods, one would think that the spread of

the fames would be a matter of some time. The result of the Clapham Junction experience goes to show that electric lamps should not be placed in windows or showcases containing inflammable material, without being inclosed in an outer glass case or other suitable precaution. In this connection it is interesting to note the experienoe of Mr. D. H. Helps, of Reading, as related in the *Journal of Gas Lighting* some 2 years ago. A bottle was being opened in a dining room lighted by means of incandescent electric lamps, when the cork flew out and struck one of the bulbs, with the result that the glass broke, and there was a blaze of light, due to the formation of an arc or short circuit, which was sufficiently powerful to fuse the brass work. The melted metal fell and ignited the tablecloth under the lamp. From this experience Mr. Helps thinks it is probable that the accidental forcible fracture of the lamp at Clapham Junction may have started the fire by short circuit, rather than by the highly heated filament. Another suggestion is that when a filament lamp breaks the sudden exposure of the red hot carbon or metal may cause a momentary rise of temperature. Whatever the exact cause may be is a matter that can best be discussed by electricians. The practical point is the necessity for proper protection of the lamps. Although the Clapham disaster has directed public attention to the matter, small outbreaks of fire have not been uncommon in electrically lighted premises. The returns of the London Fire Brigade show that the fires caused by electricity average about one to every 700 electric consumers, while those caused by gas are one to every 2,200.

Items of Interest
FROM VARIOUS LOCALITIES.

Mr. D. T. Burritt, formerly Superintendent of the Springfield (Mass.) Gas Light Company, has accepted the position of General Superintendent of the National Gas, Electric Light and Power Company, of Detroit, Mich.

Messrs. J. G. White and Company inform us that to assist in caring for its increasingly important irrigation and hydraulic work, they have recently added to their large and experienced staff of hydraulic and irrigation engineers, with title of Chief Irrigation Engineer, Mr. I. W. McConnell, recently Supervising Engineer, U. S. Reclaiming service, and well known in connection with the Gunnison tunnel, formally dedicated by President Taft, as well as in connection with other important irrigation work.

"B. R.," writing from Lawrence, Mass., under date of the 21st inst., says: "Some days ago (to be precise, the 19th inst.) Mr. Edmund E. Branch, an employee of the Lawrence Gas Company, was called into the office of the Company's cashier, much to his disquietude, for the summons was decidedly a peremptory one. He responded at once and was surprised to find several of his workmates not far from cashier S. A. McCarthy's desk. That gentleman (and gentleman he surely is) stepped out to receive the incomer. When Mr. McCarthy got through with him (in the shape of a short, right-to-the-point speech) poor 'Mac' was a sight to behold—he was between tears and smiles, the former being the closer to him. Mr. McCarthy, in the course of his presentation speech, handed over to Branch a well filled purse, the latter and its contents being, as the presenter said, a token of their comradeship, and to let him know that his 50 years' of faithful work to the corporation, and of loyalty to his fellows, were fully appreciated by all of them."

"G. S. G.," writing from Waterloo, Ia., in a note to hand the 22d inst., incloses the following mention: "The Citizens Gas and Electric Company, of this city has gotten out a very attractive booklet containing many handsome illustrations of matters and things in and about this rapidly growing business center. The illustrations, of course, are largely given over to reproductions of the noted public structures, with various scenes of beauty in the public parks and along the river. Several telling views of our near neighbor—Cedar Falls—are also given. The promised reduction in gas and electric light rates that was arranged some days ago is also officially announced. The reduction amounts to virtually 10 per cent. from those heretofore ruling and gives the residents gas at $1 per 1,000 cubic feet. The Company's management is, of a verity, doing all it can towards helping the growth of this beautiful Iowa city."

The proprietors of the Salem (Mass.) Gas Company have established a minimum rate of 75 cents per month, which certainly must be considered a liberal rate toward the intermittent gas user.

Mr. W. A. Baehr's report respecting the physical condition of the municipal gas making plant at Wheeling, W. Va., may be looked for now at any time. A comprehensive system of estimates for the new plant will shortly be submitted. It is likely that a water gas plant will be recommended, which is passing strange, judging from the nearness of good bituminous coal, which is virtually at the gates of the city.

The people of Hollywood, Cal., are clamoring for a gas supply, and certain capitalists of Los Angeles are considering the feasability of taking a try over the venture.

Mr. Alexander Wyness, formerly in charge of the plant of the Winona (Minn.) Gas Light and Coke Company, has been in charge of the plant at Spartanburg, S. C., since the 1st inst.

On the 22d inst. the merging of the gas interests of Atlantic City was perfected. Under the agreement the Atlantic City Gas and Water Company and the Consumers Gas and Fuel Company, of Atlantic City, have been consolidated under the title of the Atlantic City (N. J.) Gas Company, with a capitalization of $1,000,000. Mr. C. H. Geist has been chosen Prssident of the succeeding Company.

Mr. J. Stuart, for some time in the service of the Belfast (Me.) Gas and Electric Company, recently severed his connection therewith to become Manager of the W. K. Toole Hardware Company, of Pawtucket, R. I.

Mr. Homer M. Eaton, well-known in Western gas circles from his brilliant record made as Superintendent of the Saginaw City (Mich.) Gas Company, has accepted the position of General Manager to the Flint (Mich.) Gas Company. Mr. Eaton took up his new duties about a week ago.

At the petition-hearing of the Springfield (Mass.) Gas Light Company, held by the Board of Gas and Electric Light Commissioners, to consider whether or not the Company should be granted the right to issue $325,000 of new capital, no opposition was made. The Company was represented before the Commissioners by Messrs. C. H Tenney, D. G. Manson and H. A. Gedney.

At the annnal meeting of the shareholders in the Perfected Mantle Company, of Springfield, Mass., which was held in its New York offices, 40 Wall street, Mr. Charles H. Tenney was chosen First Vice-President of the Company, and Mr. Edwin E. Witherby was named Second Vice-President. These are changes from the 1909 list of officers. The others in executive position are: Directors, M. C. Scheu, C. H. Tenney, E. E. Witherby, W. S. Pratt, F. W. Mayer, Moses Newton, H. F. Parcher, A. C. DeGraw and G. A. McLaughlin; President, W. C. Scheu; Treasurer, Walter S. Pratt; Secretary, F. W. Mayer.

At the annual convention of the California Association of Plumbers, Gas and Steam Fitters, which was held in San Francisco, a fortnight ago, the officers elected were: President, Wm. Cahill; Vice-Presidents, Martin Miller, W. F. Brown, H. McManus; Secretary, Walter Ford. The meeting next year will be held in Oakland.

The Shelby County Water, Gas and Electric Company, of Shelbyville, Ind., has been incorporated with a capital of $250,000. Its Directors are: H. L. Olds, J. T. Bacon, M. O. Straight, T. C. Kelly and Ambrose Petry.

Mr. Henry Higgins, whose father is constructing the new gas works at Gadsden, Ala., has been appointed resident Superintendent of the plant. This looks a rather responsible position to intrust to a youngster quite some distance this side of his 21st year.

At the annual meeting of the Grand Rapids (Mich.) Gas Light Company the result reached was: Directors, Emerson McMillin, A. P. Lathrop, B. O. Tippy, J. B. Pantlind, L. J. Rindge, H. Idema, W. H. Anderson, L. H. Withey, H. Sullivan; President, Emerson McMillin; Chairman, J. B. Pantlind; Vice-President and General

Manager, B. O. Tippy; Vice-President (2d), A. P. Lathrop; Secretary, Glenn R. Chamberlain; Treasurer, J. R. Russell.

PRESIDENT LEAVITT, of the Grand Island (Neb.) Gas Company, has again kept his word. Some time ago he said that if the residents would increase their patronage he would decrease the selling rate. They did their part of the work, now he has performed his. A reduction all round, amounting to virtually 6½ per cent. on the existing rates, takes effect February 1st; the Grand Island plan of payment is graded on monthly consumption quantities, and the new schedules have these extremes: $1.90 per 1,000 cubic feet, maximum; $1.50 per 1,000, minimum. The Company will add 3 miles of pipe to its main service this spring.

THE Batesville (O.) Gas Company has just been organized by Messrs. J. C. Pease, P. P. Humbert and P. V. Paul, of Washington, Pa.; Walter House, of Batesville, and J. W. Hill, Quaker City, O. The officers are: President, J. C. Pease; Vice-President, Walter House; Secretary, J. M. Hill; Treasurer, P. P. Humbert; Manager, Homer Israel.

MR. C. F. FARMER, the cultivated Superintendent of the Austin (Tex.) Gas Company, wished it was a boy; but Mrs. Farmer won out. It is a girl, whose first weight was made at 10 pounds.

MR. W. S. FARROW, supervisor of the lighting division of the trading of the Cambridge (Mass.) Gas Company, has been very successful this winter in his efforts to keep the tungsten lamp in its proper sphere or zone, or what not. He has also been signally successful in inducing people to pay close attention to their gas fixtures.

MR. LAWRENCE DORAN, JR., has been appointed to a responsible position in the service of the Geneva (N. Y.) Gas Company.

MR. WM. FORSYTH, formerly in the service of the Chester (Pa.) American Gas Company, is now located in Providence, R. I., where he has to do with the interests of the Link Belt Company, Philadelphia.

MESSRS. FRANK D. MOSES and associates have incorporated the Citizens Gas and Power Company, of Collinsville, Ind. It is capitalized in $125,000.

MR. BERT CARPENTER, in his capacity as Manager of the Elwood (Ind.) Heat and Light Company, is our authority for the statement that its owners are proposing to erect the apparatus necessary for the manufacturing of artificial gas at that place.

THE proprietors of the Oklahoma (Col.) Gas Company are arranging to extend the piping system to the outlying settlement of Dawson.

ACCORDING to the local papers the Brooklyn Union Gas Employees' Association, urged on by the success of their initial social attempting of last year, are perfecting plans for this year's renewal of the affair, which will be on a much more complex programme than that of a twelvemonth ago. The Committee of arrangements, under the leadership of the President (Mr. Paul Mitchell), has engaged Prospect Hall, as the meeting place, and has named February 4th as the date, for the entertainment. The vaudeville feature of the show will be a quite pronounced one. And a further novelty is to be provided by the Floor Manager (Mr. Richard Murphy) in the shape of a grand march, which he assures the members will put to rout even the famous "lope" of 1909.

THE proprietors of the Detroit (Mich.) City Gas Company have awarded a contract for necessary new water gas apparatus to the Gas Machinery Company, of Cleveland, O. The terms of the contract are virtually a duplication of those submitted 2 years ago, under which the Gas Machinery Company, of Cleveland, was the successful bidder.

AT the annual meeting of the Boonton (N. J.) Gas Light Company the officers elected were: President, F. E. Morse; Vice-President, Walter W. Riddle; Treasurer and Secretary, Philip W. Hammond.

AT the annual meeting of the Marshall (Mich.) Gas Light Company the following officers were elected: Directors, C. E. Gorham, Carroll Collins, H. E. Winsor, L. G. Collins, Renetta Hoffman; President, Carroll Collins; Vice-President, H. E. Winsor; Secretary, Renetta Hoffman; Treasurer and General Manager, Carroll Collins. Mr. H. E. Winsor succeeds Mr. T. G. Garrett as Vice-President and Director.

AT a regular meeting of the Directors in the Portland (Me.) Gas Light Company a dividend of $1 50 per share was declared, to be distributed amongst holders of record, as of the 21st inst. It was also voted to make a reduced rearrangement of the selling rates, to become effective April 1st. The gist of the schedule is:

Monthly Consumption.	Rate per 1,000.
Less than $50 in value	$1.15
" " 100 "	1.10
" " 500 "	1.05
Over.....500 "	1.00

THE plant and franchises of the Fayetteville (N.C.) Gas and Electric Light Company were sold at auction some days ago, by order of the United States Court. The purchaser was Mr. Thos. Badger, Jr., at his bid of $11,000. Mr. Badger has been in charge of the Company for some time.

PUBLIC LIGHTING TABLES FOR FEBRUARY, 1910.

These tables are those used for computing the various times during the year, for New York and vicinity, when public lamps of all sorts are to be lighted and extinguished. As will be seen they include the all night and every night practice, and the moontable schedule as well. They were compiled by the American Meter Company, New York city.

Table No. 1.
FOLLOWING THE MOON.

Day of Week.	Date.	Light.	Extinguish.
		P.M.	
Tue.	1	5.50 L.Q.	1.30 A.M.
Wed.	2	5.50	2.30
Thu.	3	5.50	3.30
Fri.	4	5.50	4.40
Sat.	5	5.50	5.40
Sun.	6	6.00	6.00
Mon.	7	6.00	6.00
Tue.	8	6.00	6.00
Wed.	9	6.00 N.M.	6.00
Thu.	10	6.00	6.00
Fri.	11	6.00	6.00
Sat.	12	6.00	6.00
Sun.	13	6.00	5.50
Mon.	14	10.10	5.50
Tue.	15	11.30 F.Q.	5.50
		A.M.	
Wed.	16	12.40 F.Q.	5.50
Thu.	17	1.50	5.50
Fri.	18	2.50	5.50
Sat.	19	3.50	5.50
Sun.	20	4.40	5.50
Mon.	21	5.20	5.50
Tue.	22	No L.	No L.
Wed.	23	No L. F.M.	No L.
Thu.	24	No L.	No L.
Fri.	25	6.20 P.M.	8.20 P.M.
Sat.	26	6.20	9.20
Sun.	27	6.20	10.20
Mon.	28	6.20	11.20

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	229.00
February	188.20
March	184.10
April	161.40
May	152.00
June	136.50
July	146.20
August	165.50
September.	181.30
October	217.10
November.	224.50
December	249.30
Total, year	2237.10

Table No. 2.
NEW YORK CITY.
ALL NIGHT LIGHTING.

Day of Week.	Date.	Complete Lighting in 1 Hour.	Complete Extinguishing in 50 Minutes.
		From Time Given.	
		P.M.	A.M.
Tue.	1	4.47	6.07
Wed.	2	4.47	6.07
Thu.	3	4.47	6.07
Fri.	4	4.47	6.07
Sat.	5	4.57	6.02
Sun.	6	4.57	6.02
Mon.	7	4.57	6.02
Tue.	8	4.57	6.02
Wed.	9	4.57	6.02
Thu.	10	4.57	6.02
Fri.	11	4.57	6.02
Sat.	12	5.07	5.57
Sun.	13	5.07	5.57
Mon.	14	5.07	5.57
Tue.	15	5.07	5.57
Wed.	16	5.07	6.52
Thu.	17	5.07	5.52
Fri.	18	5.07	5.52
Sat.	19	5.17	5.47
Sun.	20	5.17	5.47
Mon.	21	5.17	5.47
Tue.	22	5.17	5.47
Wed.	23	5.17	5.42
Thu.	24	5.17	5.42
Fri.	25	5.17	5.42
Sat.	26	5.22	5.32
Sun.	27	5.22	5.32
Mon.	28	5.22	5.32

TOTAL HOURS DURING 1910.

	Hrs. Min.
January	428.30
February	358.15
March	353.10
April	298.10
May	263.20
June	234.45
July	248.30
August	278.00
September.	311.25
October	370.05
November.	397.40
December	438.35
	3980.25
Deduct on account of 50 minutes extinguishing time....	30.25
Total, year	3950.00

The Market for Gas Securities.

The market for Consolidated gas was of the most erratic sort during the week, those for the short side, however, having cause for contentment, since values were melted in a fierce speculative heat that would be denied. Consolidated managed to get down to 140¼ with a subsequent rally to 143. The market at noon to-day (Friday) was 142¼–143. The Company's annual report was given as the cause for the break. The usual quarterly dividend of 1 per cent. was declared. The report submits a queer mess of figures, which, of course, are understandable to those who formed them; but to no one else. However, it is shown there was an increase of not far from 7 per cent. in the sendout, as compared with 1908, and that the stock earned quite a bit less than the 4 per cent. which the Company is paying. In that event we fail to understand why the Company decided on paying a dividend for the quarter that was not earned by the trading of the quarter. Those who thought they did know something that would be arranged for was that a seggregation of the Co.'s electric lighting holdings would be declared with a plan-method of carrying out the same. Well, the real truth is that the holdings of all kinds are to remain in the aggregate.

The outside marke is also notably weak, save Brooklyn Union, which keeps above 150. Peoples, of Chicago, is under 110—a fair value would be closer to 150. The annual meeting of the Company will be held at 11 A.M., 10th inst. Mr. J. A. McArthur has been elected Secretary and Treasurer of the Hartford (Conn.) Gas Light Company, vice Mr. R. E. Slade.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

16 WALL STREET, NEW YORK CITY.

JANUARY 31.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	142⅛	143
Central Union Gas Co. — 1st 5's, due 1972, J. & J.	3,000,000	1,000	98	101
Equitable Gas Light Co.— Con. 5's, due 1932, M. & S.	1,000,000	1,000	—	105
Mutual Gas Co.	2,500,000	100	155	165
New Amsterdam Gas Co.— 1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101¼
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	37	43
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	100	101
New York and East River— 1st 5's, due 1944, J. & J.	3,500,000	1,000	104	107
Con. 5's, due 1945, J. & J.	1,500,000	—	97	101
Northern Union— 1st 5's, due 1927, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	—	75
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	100	105
The Brooklyn Union	15,000,000	1,000	150	153
1st Con. 5's, due 1948, M. & N.	15,000,000	—	95	99
Yonkers	200,000	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	⅝	11-16
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	65
" 1st Mtg. 5's	500,000	1,000	90	96
Boston United Gas Co.— 1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	73	73¼
Capital, Sacramento	500,000	50	—	35
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,500,000	1,000	104	106¼
Cincinnati Gas and Electric Co.	28,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,982,750	100	90¼	91
Preferred	2,026,500	100	75½	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	—	105
Mortgages, 6's	3,600,000	—	—	118
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	17
Con. Mtg. 5's	880,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	458,000	—	102	105
Detroit City Gas Co	5,000,000	50	—	50
" Prior Lien 5's	4,619,000	1,000	97	100¼
Detroit Gas Co., 5's	881,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,225,000	1,000	104¼	105
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	103	103¾
Indianapolis	2,000,000	—	60	70
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	200,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	106	106¼
Preferred	2,500,000	100	—	98
Bonds	10,000,000	1,000	104	—
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co.				
" 1st Mtg. 6's	350,000	1,000	106	108¾
" 6 per cent. scrip, due 1910	100,000	25	60	60¼
Massachusetts Gas Companies, of Boston	25,000,000	100	77⅛	78

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SPECIAL MEETING.

OFFICE OF THE UNITED GAS IMPROVEMENT CO.,
N. W. CORNER BROAD AND ARCH STS.,
PHILADELPHIA, December 9, 1909.

A Special Meeting of the Stockholders of The United Gas Improvement Company will be held at the office of the Company, Northwest Corner of BROAD AND ARCH STREETS, PHILADELPHIA, on Wednesday, Feb. 9, 1910, at 12 o'clock, noon, for the purpose of acting upon the subject of a proposed increase in the authorized capital stock of the Company from 1,009,467 shares, of the par value of $50 each, to 1,110,414 shares, of the par value of $50 each.

By order of the Board of Directors.

W. F. DOUTHIRT, Secretary.

The stock transfer books will be closed from 3 P.M., Jan. 28, 1910, until 10 A.M., Feb. 10, 1910.

1801-9

ANNA VIRGINIA MILLER,

Lecturer and Demonstrator of Cookery by Gas or Electricity,

1237 Harrison Street, Kansas City, Mo.

1805-3m

Solicitor Industrial Gas Appliances

Desires transient or permanent engagement with gas company. Long experience. Very successful on gas forges, etc., engines and heating specialties.

1806-1 Address, "EXPERT," care this Journal.

Position Wanted

As water gas maker and all-round man in a water gas works.

1808-1 Address, "W. W. B.," care this Journal.

ARE YOU GETTING RESULTS?

Wanted, by a man 29 years old, with 12 years' practical experience in all branches of the gas business, a position as superintendent of works. Up to date in the manufacture of coal or water gas and the distribution of same. Reconstruction of water or coal gas plants. Can get results and handle men. First-class references. Address, "FIRE BOX," care this Jour'l.

1805-4

SITUATION WANTED.

A practical gas man, with 16 years' experience, covering construction, manufacture and operation of coal gas plants, accounting and appliance sales, desires a change. Would prefer a plant of 25,000–50,000 in the South or Southwest, where energy and ability would be required and appreciated. Willing to base compensation on results obtained.

1807-3 Address, "L. A.," care this Journal.

WHO

Is in Need of the Services of a Superintendent of Distribution?

Fifteen years in distribution department, 2 years in manufacturing department. Water gas machinist and draftsman. Age 45. Married.

1808-3 Address, "ACTION," care this Journal.

Situation Wanted.

Young man, 27 years old, experienced in construction, distribution and new business departments, desires to secure employment with company in city of 10,000 to 25,000. Can handle men. Best reference. At liberty Feb. 15. Address, "W.,"

1808-1 Care this Journal.

WANTED,

A Working Foreman

For a plant running one bench 6's half-depth, and who can lay gas mains and services. Salary, $75. Plant located in northern part of Central States.

Address, "Z.,"

1807-2 Care this Journal.

WANTED, BY MARCH 30,

Head Stoker for Coal Gas Plant in Small Town,

Capable of doing anything around works. State experience. Address, "PLANT,"

1807-tf Care this Journal.

WANTED,

A First-Class Meter Repairer

In Central New York city of about 125,000. Steady work. Address,

SYRACUSE LIGHTING COMPANY,

1807-2 SYRACUSE, N. Y.

WANTED,

SMALL WATER GAS MACHINE,

Not over 5-foot set. U. G. I. type preferred.

Address,

LOCK BOX 92,

1807-2 EAGLE GROVE, IA.

FOR SALE,

One set of 4 purifying boxes 12 feet 8 inches by 10 feet 9 inches by 3 feet, in good condition, with centerseal and 10-inch connections.

1771-tf YORK GAS CO., York, Pa.

FOR SALE,

Second-hand gas apparatus in good order. Selling because outgrown. Ready for immediate delivery.

One 6-foot Tufts' Station Meter, Hinman Drum, 10-inch connections.
One 5-foot Tufts' Station Meter, Hinman Drum, 8-inch connections.
One Standard Washer Scrubber and Standard, with inlet and outlet valves, 10-inch connections.
One No. 3 P. & A. Tar Extractor, 8-inch connections.
Two 3-blade McKenzie Exhausters, 8-inch connections.

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Utilize Your Gas Liquor.
NO EXTRA LABOR OR OPERATING EXPENSES.
IMPROVED AMMONIA CONCENTRATOR.
About 100 in use. Write to
STROH & OSIUS, Patentees, or
MICHIGAN AMMONIA WORKS, - Detroit, Mich.

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CONSULTING ENGINEER,
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GAS MACHINERY COMPANY,
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Will advise on commercial engineering subjects and operation of gas and electric properties.
40 WALL STREET, - NEW YORK

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WITH OR WITHOUT
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All Usual Codes.

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"THE MINER"
GLOBE STREET LAMPS.
OVER FORTY YEARS IN USE THE WORLD OVER.
THE BEST STREET LAMPS
for
ALL KINDS OF GAS OR BURNERS.
This is only one of a Large Variety of Styles.
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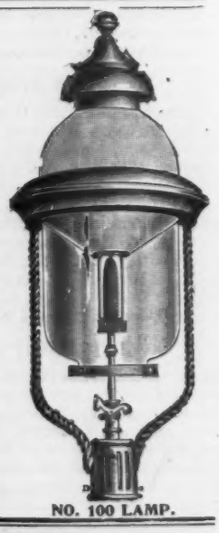
NO. 100 LAMP.

BINDERS
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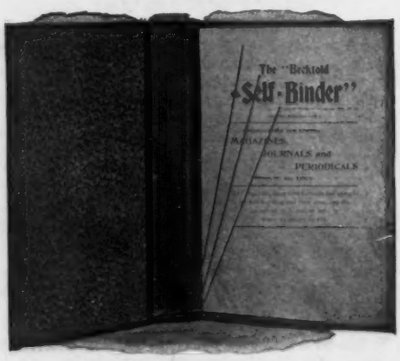
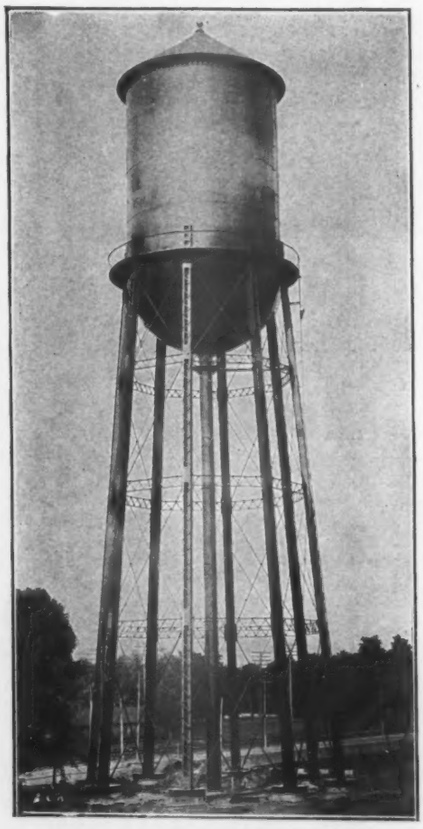
JOURNAL.
PRICE,
$1.
FOR SALE BY
AMERICAN GAS LIGHT JOURNAL 42 Pine St., New York City.


GASHOLDERS,

WATER TOWERS---STANDPIPES---STRUCTURAL STEEL,

DESIGNED, CONSTRUCTED AND ERECTED.



Water Tower, Louisville, Ky.
Capacity, 1,200,000 Gallons. Height, 220 Feet.

For such work our shop equipment and erection force are unsurpassed, which enables us to quote attractive prices.

DESIGNS AND ESTIMATES FURNISHED ON APPLICATION.

CHICAGO BRIDGE AND IRON WORKS,

Main Office and Works: Washington Heights Station, Chicago. Branch Office: 30 Church St., New York.

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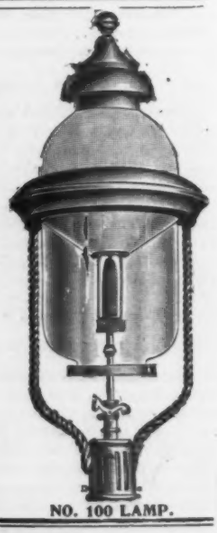
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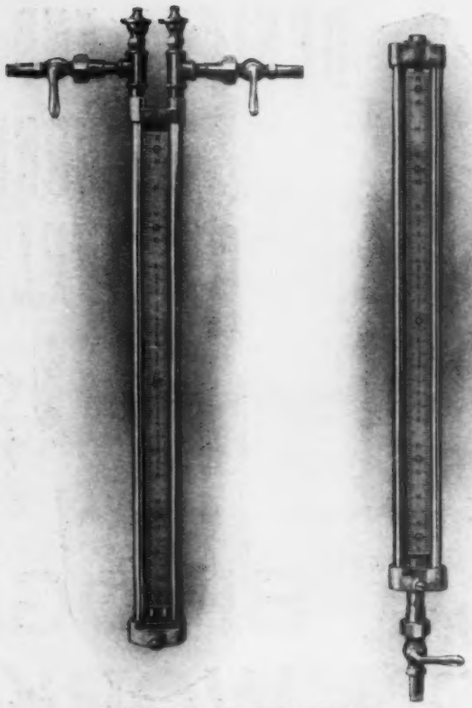

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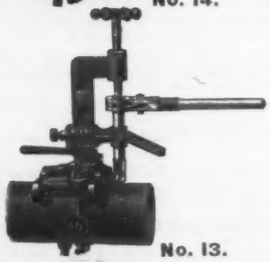
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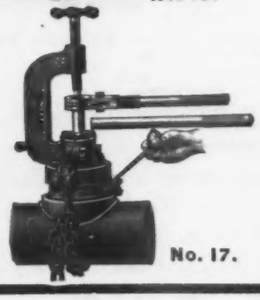
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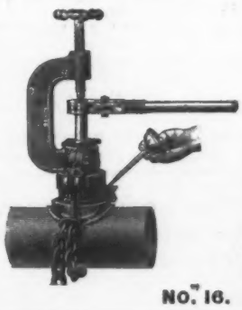
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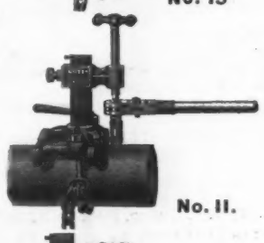
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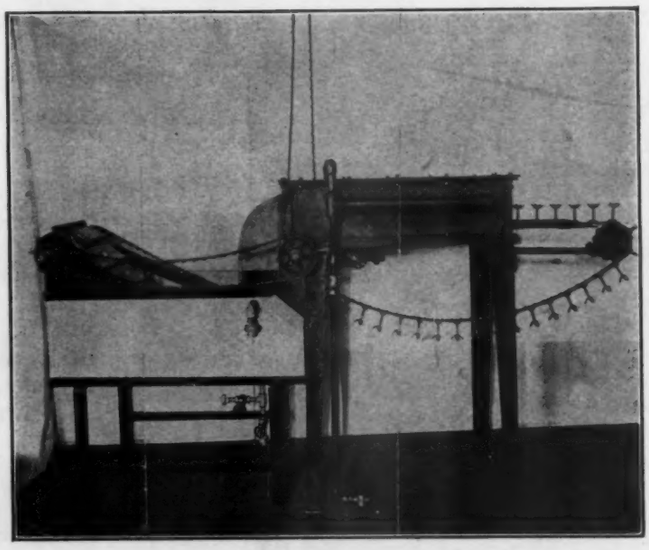

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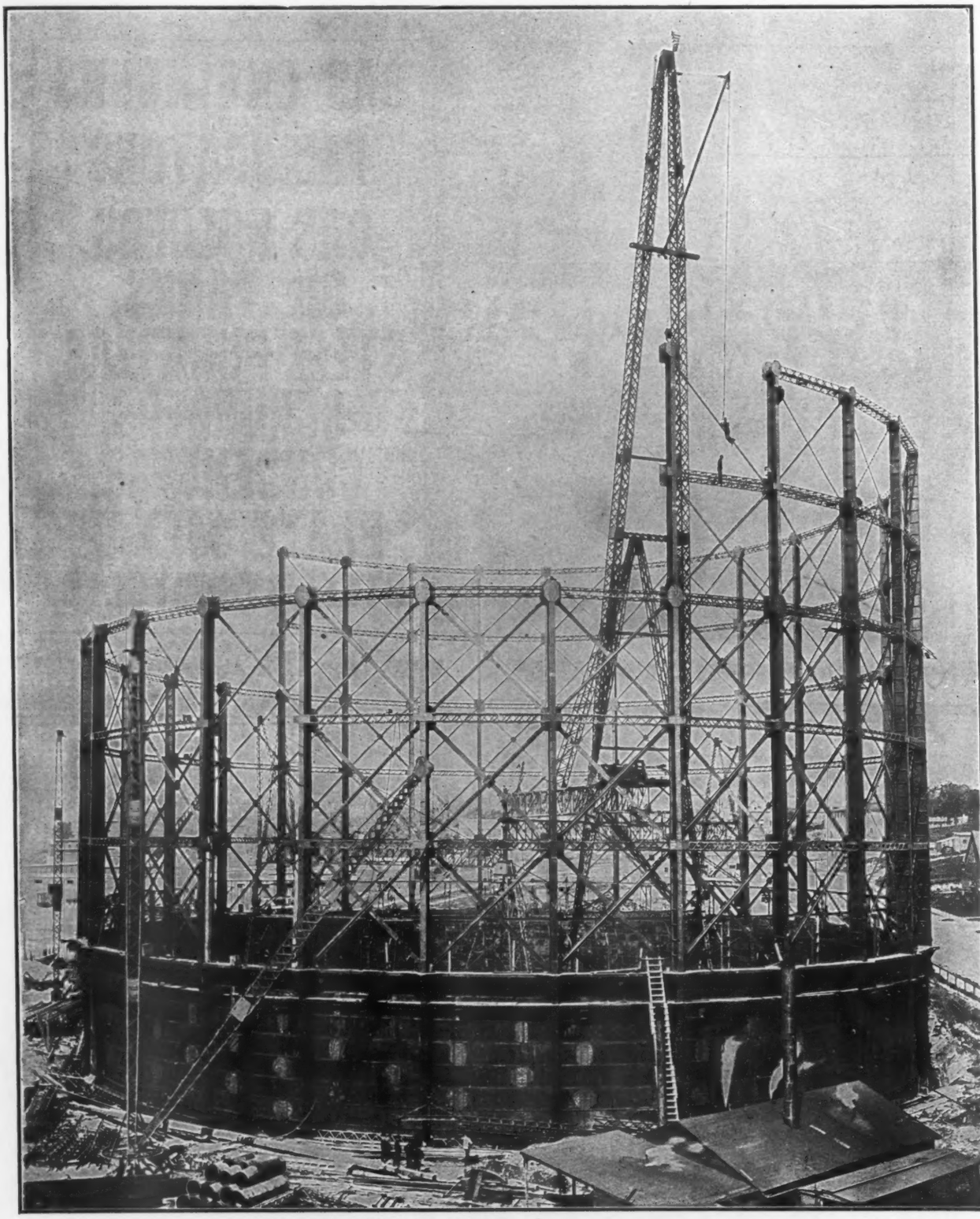

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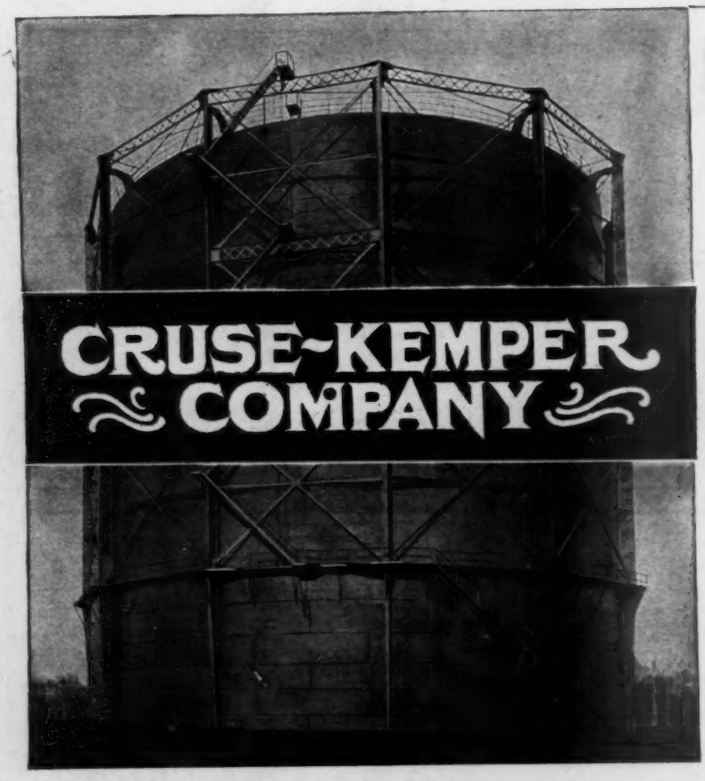

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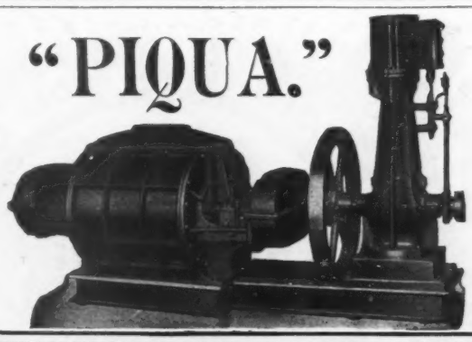

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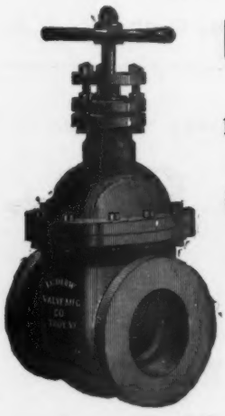

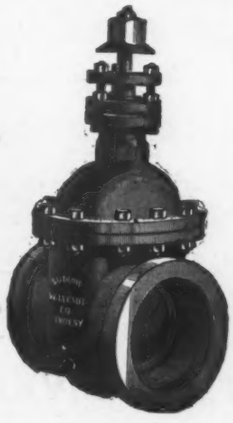

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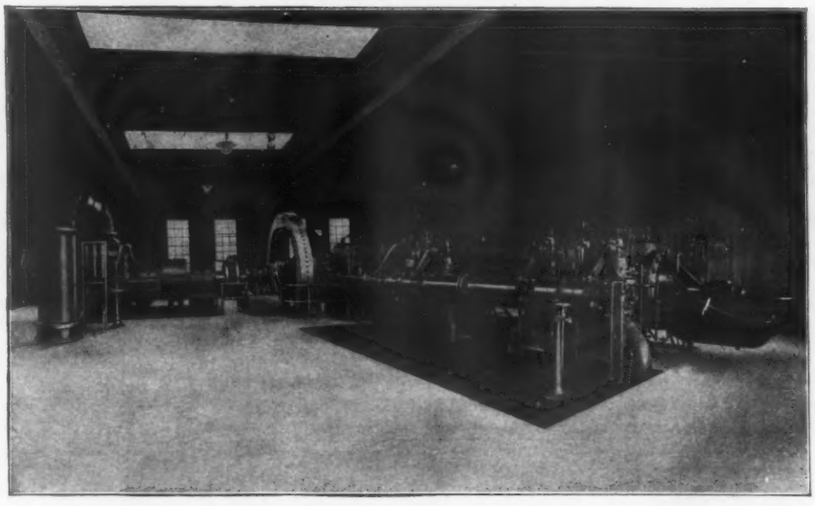

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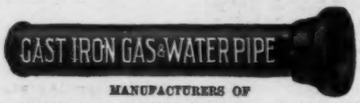

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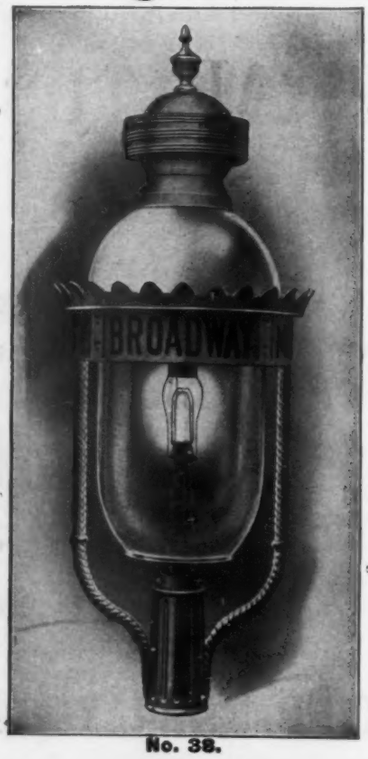

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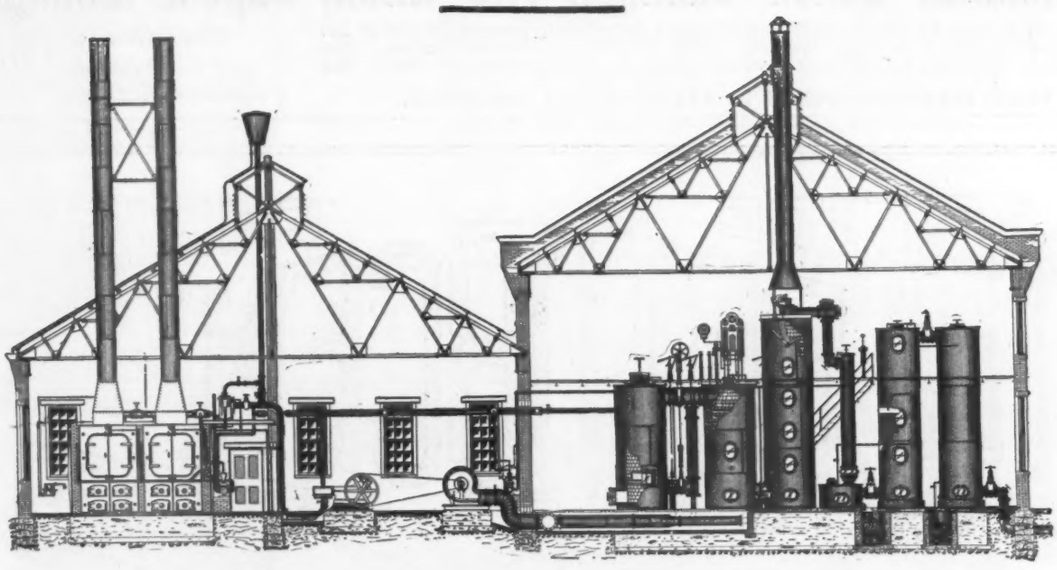

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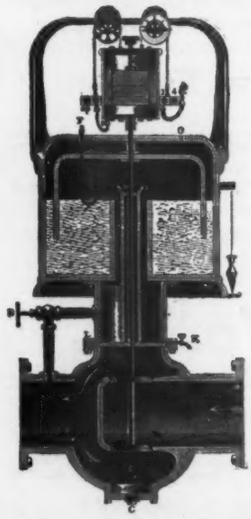

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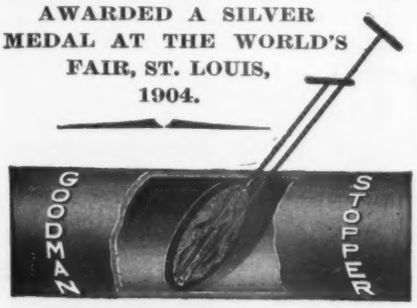

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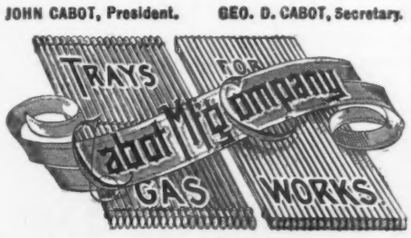

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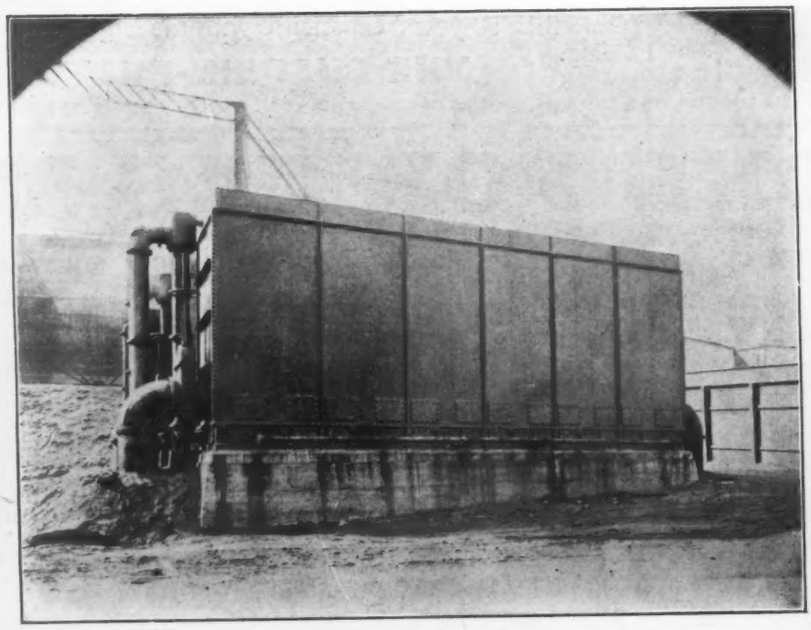

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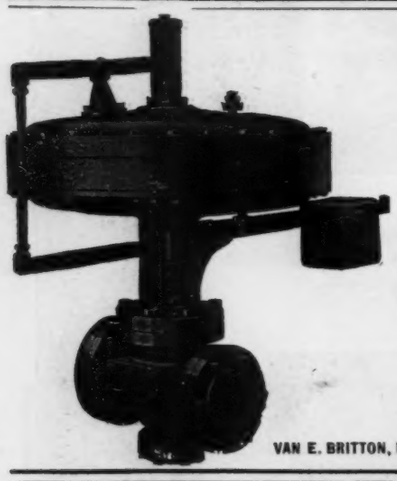

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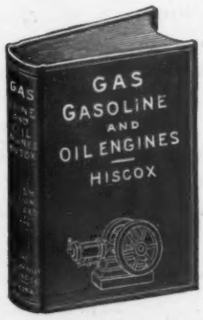

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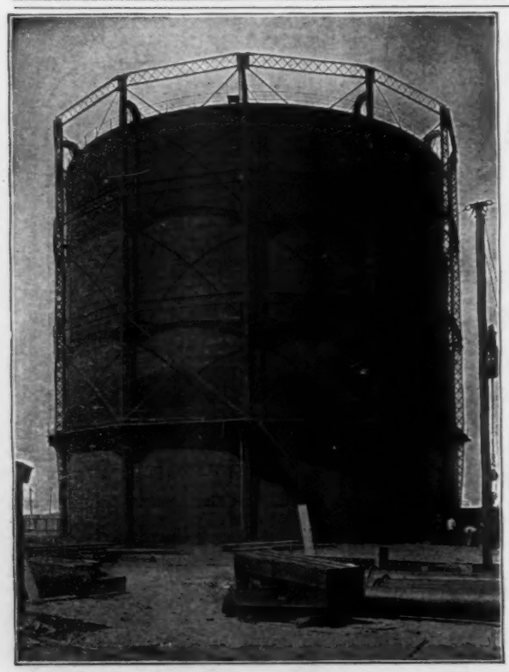

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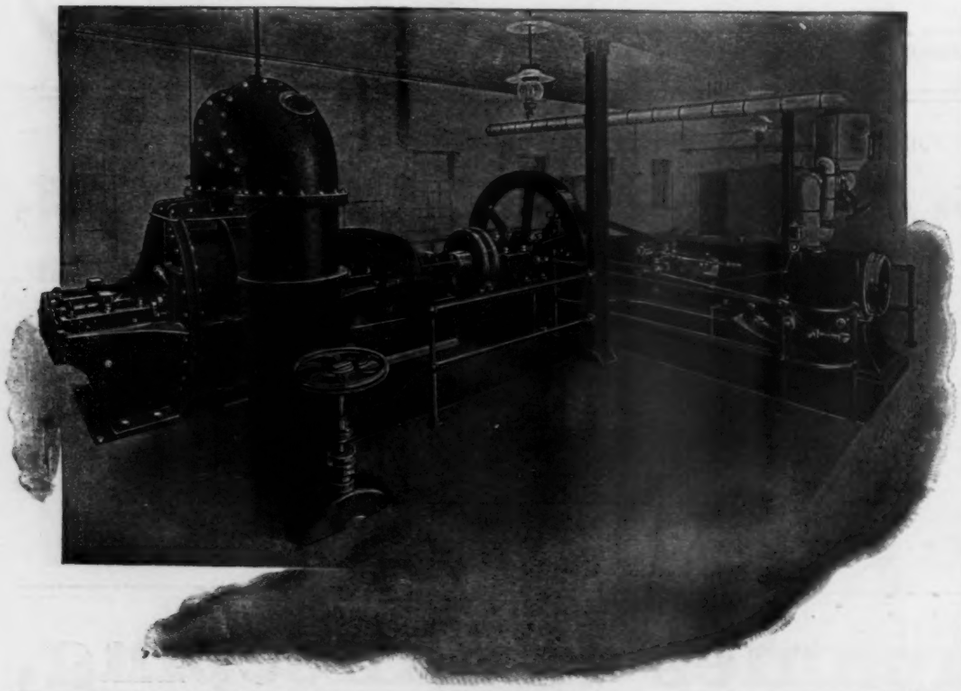

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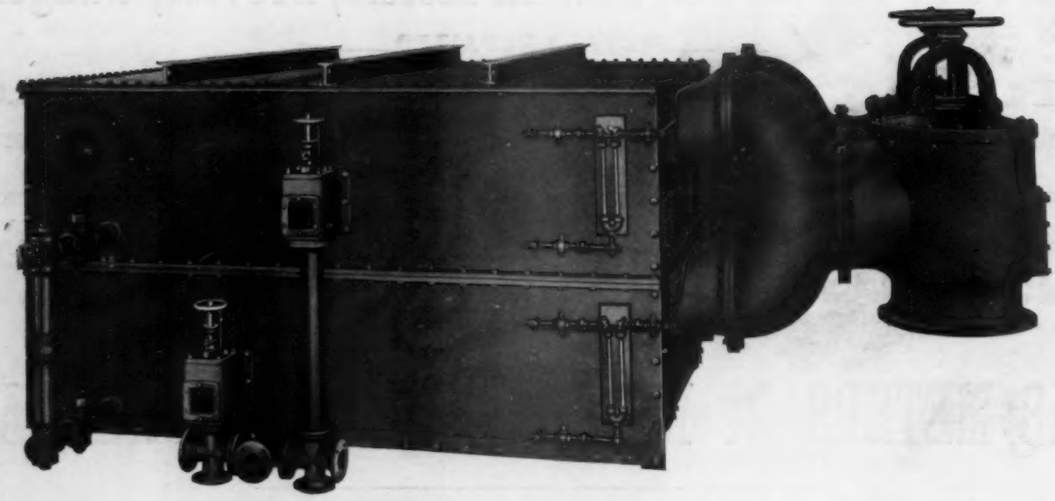

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